DTM Distributed Transmitter-Monitor

User Manual

Installation, operation, maintenance

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DTM Series Distributed Transmitter Monitor Introduction

Fully Digital

The DTM series digital transmitter monitor is ProvibTech's vibration monitor, vibration transmitter and vibration switch all rolled into one package. Each DTM module can be operated independently or networked together to create a machine protection system. It has all the functionalities of an API 670 multi-channel monitor plus a unique field linearization feature which enables the use of any manufacturers' probe and extension cable combination. DTM modules are fully programmable, flexible, and highly reliable.

Fully Programmable and Flexible

The DTM is modular in nature and can easily be expanded into a larger vibration system with the addition of a:
DTM10 (Proximity Probe Sensor Module)
DTM 20 (Case Vibration Sensors Module)
DTM 30 (temperature Module)
DTM 96 (Communication Module)
DTM- CFG (Configuration Software)

DTM10 is a proximity probe sensor module which provides measurements in radial vibration, axial position(thrust), and speed / phase reference. The DTM10 works with any proximity probe system combination (including other manufacturers) and can be used:

- With or without Probe Driver
- In any combination of probe and extension cable. The DTM10 has a field linearization feature which enables the DTM10 to interface to any proximity probe system. This feature greatly reduces the requirement for spare parts.
- Works with any shaft material (Steel, Tungsten, K-monel and more).

DTM20 is a case mounted seismic sensor module which provides case vibration measurements in acceleration, velocity, or displacement. The DTM20 works with any case mounted sensor (including other manufacturers):

- Accelerometers
- Velocity Transducers

DTM30 is a temperature module which works with:

- Resistance temperature detector (RTD)
- Thermocouple

DTM96 is a communication module that can be used to network up to (32) DTMs together to form a vibration protection system. The DTM96 can be used to communicate directly with control systems (PLC or DCS) via modbus to provide data from the DTMs such as: alarm status, system status, overall value, and more.

DTM-CFG is the software used to configure the DTM modules (DTM10 and DTM20) either with a local laptop computer or a remote computer on the network (requires Modbus connection).

Configurable Parameters:

- Measurement Type (Case Vibration, Radial Vibration, Axial Position, and Speed/Phase)
- Sensor Type and Sensitivity (Proximity Probe, Accelerometer and Velocity Transducer)
- Full Scale Range (g, ips, mm/s, rms, pk, etc..)
- Time Delays
- Alarm Set Points

Observe:

- Alarm and Channel OK Status
- Trip Multiply
- Bypass and Overall Vibration Level

Control:

- Trip Multiply values
- Bypass and Reset functions

Note: The DTM can be pre-configured at the factory. DTM-CFG software is only required when field configuration is desired.

Highly Reliable System

The DTM was designed to be used for critical machines as well as balance of plant applications. Built into every DTM is a system redundancy based upon a reliable microprocessor and proprietary system diagnostics which all contribute to a robust system design which will maximize system uptime.

Power Redundancy- The DTM module has redundant power supply inputs to maximize the reliability of the system. A single power supply failure will not affect the operation of the system.

Output Redundancy- The DTM module is equipped with redundant 4-20mA outputs, redundant relay outputs, and a Modbus communication port. The DTM relay outputs can be configured for any logic configuration required.

Channel Redundancy- the DTM can be configured for triple redundancy with multiple DTMs networked together.

System Diagnostics- the DTM performs internal diagnostic tests to search for errors: sensor status, supply voltage, system power up, fieldbus status and more. If there is an error, the system OK status LED on the DTM will go off, and an error will be registered for the channel and sent via Modbus.

Reliable Microprocessor- critical data and system configuration is stored in a solid-state memory chip. The memory chips are designed not to lose data during an interruption of power. Once power is restored, the critical data and system configuration are recovered from the memory chips.

Additional Features

Power-Up Inhibit- This feature decreases false alarms due to higher vibration levels during machine start-up.

Condition Monitoring- Each DTM module has a buffered output for easy connection to a condition monitoring system or other vibration analysis hardware.

Selection Guide of DTM Modules

Model Number	DTM10	DTM20	DTM30	DTM96	DTM-CFG
	Radial Shaft Vibration, Thrust & Speed	Case Vibration	Temperature, Dual Channels	Accessory: Communication Module	Accessory: Configuration Software
Available as Pre- Configured or Field Programmable ***1**	●	●	●		●
Vibration Measurements					
Radial Vibration	●				
Axial Position	●				
Speed/ Phase Reference	●				
Case Vibration		●			
Temperature			●		
Sensor Interfaces					
Accelerometer		●			
Velocity Transducer		●			
Proximity Probe	●				
Works With or Without Probe Driver	●				
Thermocouple, RTD			●		
Outputs/ Communications					
Redundant 4-20mA Output	●	●	**S**		
Relay Output	●	●	●		
Redundant Power Supply Input	●	●	**S**		
Modbus Output	●	●		● (isolation)	
Buffered Output	●	●			
Features					
Push Button Setup (Limited Settings)	●	●	●		
Power-Up Inhibit	●	●	●		
System OK Checking	●	●	●		
Hazardous Rating (CSA, ATEX, TR CU) II 3 G Ex nA II T4 Class I, Div.2; Grps A, B, C & D, T4 2Ex nA II T4X	●	●		●	
Network DTMs via Modbus ***2**	●	●		●	
Warranty- 5 years	●	●	●	●	

● = Complete Offering, S= Single 4-20mA Output or power supply input

Notes:

*1 = Field programming requires DTM-CFG-K Configuration Software kit. Without the software, the DTMs can only be configured for alarm set points and ZERO adjustment.

*2 =To network up to 32 DTMs via Modbus, requires (1) DTM96 Communication Module

DTM10 Proximity Distributed Transmitter-Monitor

(Shaft Vibration, Thrust Position and Speed)

The DTM10 distributed vibration transmitter-monitor is ideal for monitoring machine vibration using proximity probes and a Modbus interface to a PLC or DCS system. The DTM also contains redundant power supplies and redundant 4-20mA transmissions. Using Provibtech's unique strategy, the DTM can interface with almost any proximity probe system without hardware changes.

Applications include:

- ✓ **Turbines**
- ✓ **Compressors**
- ✓ **Motors**
- ✓ **Pumps**
- ✓ **Fans**
- ✓ **Blowers**
- ✓ **Centrifuges**
- ✓ **Generators**
- ✓ **Turbochargers**

DTM10 Fully Configurable via Software

- ✓ **Vibration Monitor Module**
- ✓ **Thrust Position Monitor Module**
- ✓ **Speed Monitor Module**
- ✓ **Phase Reference Monitor module**

DTM10 Features

- ✓ **Interface with almost any manufacture's proximity probe system**
- ✓ **Works with or without probe driver**
- ✓ **Direct Modbus RTU interface**
- ✓ **Redundant 4-20mA outputs**
- ✓ **Redundant power supplies**
- ✓ **Measure shaft vibration, thrust position, or speed**
- ✓ **Full digital field-configuration**
- ✓ **Dual alarms (SPDT)**
- ✓ **LED indication of system OK, Alert, Danger, and Bypass**
- ✓ **Local and remote RESET/BYPASS and Trip-multiply**
- ✓ **Buffered Output for condition monitoring**
- ✓ **Aluminum case for RFI/EMI reduction**
- ✓ **Digital condition monitoring (optional)**

Specifications

Electrical

Power Supply:

22-30VDC, 150mA.

Galvanic isolation

Frequency Response (-3dB):

Nominal frequency: 4 ~ 3.0KHz

Low frequency: 0.5 ~ 100Hz

Proximity probe Interface:

Sensitivity:

5mm and 8mm probe: 8 mV/um (200 mv/mil)

11mm probe: 4 mv/um (100 mv/mil)

25mm probe: 2mv/um (50 mv/mil)

Buffered Output:

Original, un-filtered signal

Impedance: 150Ω

Maximum cable distance: 300m (1000ft)

Sensitivity: same as the sensor

Local BNC connection and terminal block

4-20mA Output:

Dual 4-20mA, sourced (loop power not required)

Maximum load resistance: 380Ω

Alarm Setup:

0 ~ 100% FS.

Accuracy: ±0.1%.

Relays:

Seal: Epoxy

Capacity: 0.2A/240VAC, 0.4A/110VAC or 2.0A/24VDC, resistive load

Relay type: SPTD

Isolation: 1000VDC

LED Machine Condition Indicator:

OK: System OK indication

ALT: Vibration over ALERT level

DNG: Vibration over DANGER level

BYP: System in BYPASS

TRX: Digital Transmission Active

RESET/BYPASS:

Front panel push button

Remote RESET/BYPASS terminals

Trip Multiply:

Double Multiply or Triple Multiply set in DTM-CFG

Short Trip/Multi terminal to COM terminal

System alarm level will increase by a factor of 2 or 3 (DTM10-201 / 301 only)

Modbus:

RS485 Modbus RTU

Not isolated (use DTM96 for isolation)

Local push button programming:

Alert and danger set-point, ZERO calibration

Software programming (DTM-CFG):

Alert and danger set-point, time delay

ZERO and Full-Scale calibration

Full-scale high and low setup

Alarm latching/ non-latching, energized/ de-energized

Alarms programmable with alert, danger or system ok

Probe selection, linearization, and system calibration

Monitor function change: vibration, position, or speed

Modbus communication setup

Trip-multiply setup

Real-time bar-graph and alarms

Configure speed monitor to phase reference only monitor

3 layers of password protection

Digital condition monitoring (optional)

Condition management software or portable vibration data collector of ProvibTech could collect, store, and analyze machine health condition based on vibration via the bus communication of the DTM10.

Dynamic waveform data:

Real-time vibration data could be uploaded and the waveform and spectrum plot could be view by Condition management software or portable vibration data collector.

Trend Data:

The vibration data could be periodically stored by the DTM10 when it's powered on. User could collect trend data and view trend plots by Condition management software or portable vibration data collector. The trend sampling interval is configured by the related DTM-CFG software. DTM10's factory default is 10 hours. Every DTM10 could store maximum 1024 trend data.

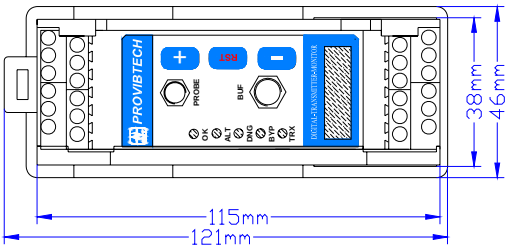
Alarm Data:

The dynamic alarm data could be stored by the DTM10 when it's powered on. The DTM10 only stores one alarm data with highest measured value. User could view waveform and spectrum plot of alarm data by Condition management software or portable vibration data collector.

Physical

Dimension:

Height:	75mm (2.95″)
	see figure below
Weight:	2.0lb (1.0kg)



Rail Mounting

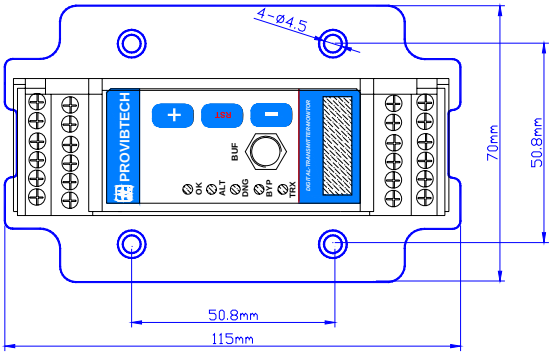


Plate Mounting

Environmental

Temperature:

Operation:	-40℃ ~ +85℃
Storage:	-50℃ ~ +100 ℃
Humidity:	90% non-condensing
Case:	Aluminum

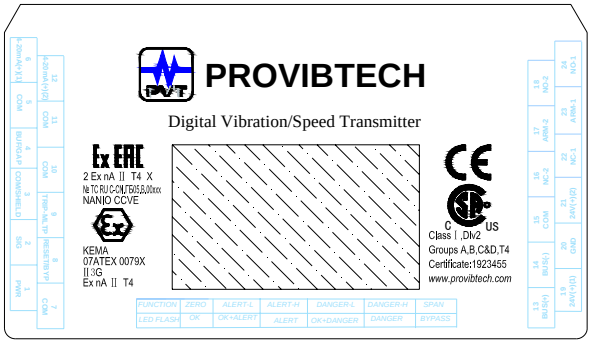
Certification

CE certified with EMC compliance

CSA:	Class I, Div. 2,Grps A,B,C&D,T4
ATEX:	II 3 G Ex nA II T4
TR CU:	2Ex nA II T4 X
	№ TC RU C- US.ГБ05.B.00476
	NANIO CCVE

Hazardous area

Marking:



ATEX Standards:

EN 60079-0

EN 60079-15

Special condition in hazardous area:

- The ambient temperature range is: -40℃≤Ta≤70℃
- DTMs must be placed inside an enclosure that is in accordance with EN 60079-15:2005.
- Provisions must be made externally to prevent the rated voltage from being exceeded by transient disturbances of more than 40 %.

Ordering Information

DTM10-AX-BX-CX-EXX-MX-SX

Customer configurable proximity distributed transmitter-monitor

Distributed vibration monitor, fully field configurable, with Modbus RTU.

AX: Alarms.

A0: With Epoxy sealed relays

A1: No Alarm

BX: Mounting.

B0: DIN rail mounting.

B1: Plate mounting.

CX: External Proximity Driver.

C0: Not required (Requires Probe and Extension Cable) (301, 302, 502 type modules)

C1: Required (Requires Probe, Extension Cable and Probe Driver) (201, 202, 501 type modules)

EXX: Probe and Cable (Series and Length) -Purchased Separately

E00*: TM0180, 5m Cable
E01: TM0180, 9m Cable
E02: 8mm Probe, 3300, 5m Cable
E03: 8mm Probe, 3300, 9m Cable
E04: 8mm Probe, 7200, 5m Cable
E05: 8mm Probe, 7200, 9m Cable
E06: TM0105, 5m Cable
E07: TM0105, 9m Cable
E08: TM0110, 5m Cable
E09: TM0110, 9m Cable
E10: 11mm Probe, 3300, 5m Cable
E11: 11mm Probe, 3300, 9m Cable
E12: 11mm Probe, 7200, 5m Cable
E13: 11mm Probe, 7200, 9m Cable
E99: Other probe systems (requiring field calibration)

MX: Digital Communication

M1*: With Modbus

M2: With Modbus and digital condition monitoring

SX: Approvals.

S0*: CE
S1: CE
CSA: Class I, Div. 2,Grps A,B,C&D,T4
ATEX: II 3 G Ex nA II T4
TR CU: 2Ex nA II T4 X
№ TC RU C- US.ГБ05.B.00476
NANIO CCVE

DTM10-201-AX-CX-GX-IX-MX-SX

Factory configured for vibration (probe driver required)

AX: Full Scale.

A0*: 0 ~ 200um pk-pk
A1: 0 ~ 1000um pk-pk
A2: 0 ~ 100um pk-pk
A3: 0 ~ 10mil pk-pk
A4: 0 ~ 50mil pk-pk
A5: 0 ~ 5.0mil pk-pk
A6: 0 ~ 200um pk-pk (0.5 ~ 100Hz)
A7: 0 ~ 1000um pk-pk (0.5 ~ 100Hz)
A8: 0 ~ 100um pk-pk (0.5 ~ 100Hz)

CX: Alarms.

C0*: Dual alarms with epoxy sealed relays
C1: No Alarm

GX: Mounting.

G0*: DIN rail mounting.
G1: Plate mounting.

IX: Frequency Response.

I0*: Normal Frequency (4~3000Hz)
I1: Low Frequency (0.5~100Hz)

MX: Digital Communication

M1*: With Modbus

M2: With Modbus and digital condition monitoring

SX: Approvals.

S0*: CE
S1: CE
CSA: Class I, Div.2, Grps A,B,C&D,T4
ATEX: II 3 G Ex nA II T4
TR CU: 2Ex nA II T4 X
№ TC RU C- US.ГБ05.B.00476
NANIO CCVE

DTM10-202- AX-CX-GX-SX

Factory configured for axial position (probe driver required)

AX: Full Scale.

A0*: -1.0 - 0 - 1.0mm (-40 - 0 - 40mil)
(Requires TM0180 or other 8mm proximity probe transducer; TM0105 or other 5mm proximity probe transducer)

A1: -2.0 - 0 - 2.0mm (-80 - 0 - 80mil)
(Requires TM0110 or other 11mm proximity probe transducer)

A2: -5.0 - 0 - 5.0mm (-0.2 - 0 - 0.2inch)
(Requires TM0120 or other 25mm, 35mm proximity probe transducer)

A3: -12.0 - 0 - 12.0mm (-0.5 - 0 - 0.5inch)
(Requires TM0150 or other 50mm proximity probe transducer)

CX: Alarms.

C0*: Dual alarms with epoxy sealed relays

C1: No Alarm

GX: Mounting.

G0*: DIN rail mounting.

G1: Plate mounting.

SX: Approvals.

S0*: CE

S1: CE
CSA: Class I, Div. 2,Grps A,B,C&D,T4
ATEX: II 3 G Ex nA II T4
TR CU: 2Ex nA II T4 X
№ TC RU C- US.ГБ05.B.00476
NANIO CCVE

DTM10-501-AX-CX-FXX-GX-SX

Factory configured for speed (probe driver required)

AX: Full Scale.

A0: 0 ~ 1,000 rpm

A1*: 0 ~ 3,600 rpm

A2: 0 ~ 6,000 rpm

A3: 0 ~ 10,000 rpm

A4: 0 ~ 30,000 rpm

A5: 0 ~ 50,000 rpm

A6: phase reference output

A7: phase reference output for digital condition monitoring

CX: Alarm.

C0*: Dual alarms with epoxy sealed relays

C1: No Alarm

FXX: Teeth per Revolution.

F01*: 1

FXX: Customer specify, number of teeth =XX

GX: Mounting.

G0*: DIN rail mounting.

G1: Plate mounting.

SX: Approvals.

S0*: CE

S1: CE
CSA: Class I, Div.2, Grps A,B,C&D,T4
ATEX: II 3 G Ex nA II T4
TR CU: 2Ex nA II T4 X
№ TC RU C- US.ГБ05.B.00476
NANIO CCVE

DTM10-301-AX-CX-EXX-GX-IX-MX-SX

Factory configured for vibration (built-in probe driver)

AX: Full Scale.

A0*: 0 ~ 200um pk-pk
A1: 0 ~ 500um pk-pk
A2: 0 ~ 100um pk-pk
A3: 0 ~ 10mil pk-pk
A4: 0 ~ 25mil pk-pk
A5: 0 ~ 5.0mil pk-pk
A6: 0 ~ 200um pk-pk (0.5 ~ 100Hz)
A7: 0 ~ 500um pk-pk (0.5 ~ 100Hz)
A8: 0 ~ 100um pk-pk (0.5 ~ 100Hz)

CX: Alarms.

C0*: Dual alarms with epoxy sealed relays
C1: No Alarm

EXX: Probe and Cable.

E00*: TM0180, 5m Cable
E01: TM0180, 9m Cable
E02: 8mm Probe, 3300, 5m Cable
E03: 8mm Probe, 3300, 9m Cable
E04: 8mm Probe, 7200, 5m Cable
E05: 8mm Probe, 7200, 9m Cable
E06: TM0105, 5m Cable
E07: TM0105, 9m Cable
E08: TM0110, 5m Cable
E09: TM0110, 9m Cable
E10: 11mm Probe, 3300, 5m Cable
E11: 11mm Probe, 3300, 9m Cable
E12: 11mm Probe, 7200, 5m Cable
E13: 11mm Probe, 7200, 9m Cable

GX: Mounting.

G0*: DIN rail mounting.
G1: Plate mounting.

IX: Frequency Response.

I0*: Normal Frequency (4~3000Hz)
I1: Low Frequency (0.5~100Hz)

MX: Digital Communication

M1*: With Modbus
M2: With Modbus and digital condition monitoring

SX: Approvals.

S0*: CE
S1: CE
CSA: Class I, Div.2, Grps A,B,C&D,T4
ATEX: II 3 G Ex nA II T4
TR CU: 2Ex nA II T4 X
№ TC RU C- US.ГБ05.B.00476
NANIO CCVE

DTM10-302-AX-CX-EXX-GX-SX

Factory configured for axial position (built-in probe driver)

AX: Full Scale.

A0*: -1.0 - 0 - 1.0mm (-40 - 0 - 40mil)
(Requires TM0180 or other 8mm proximity probe transducer)
A1: -2.0 - 0 - 2.0mm (-80 - 0 - 80mil)
(Requires TM0110 or other 11mm proximity probe transducer)

CX: Alarms.

C0*: Dual alarms with epoxy sealed relays
C1: No Alarm

EXX: Probe and Cable.

E00*: TM0180, 5m Cable
E01: TM0180, 9m Cable
E02: 8mm Probe, 3300, 5m Cable
E03: 8mm Probe, 3300, 9m Cable
E04: 8mm Probe, 7200, 5m Cable
E05: 8mm Probe, 7200, 9m Cable
E06: TM0105, 5m Cable
E07: TM0105, 9m Cable
E08: TM0110, 5m Cable
E09: TM0110, 9m Cable
E10: 11mm Probe, 3300, 5m Cable
E11: 11mm Probe, 3300, 9m Cable
E12: 11mm Probe, 7200, 5m Cable
E13: 11mm Probe, 7200, 9m Cable

GX: Mounting.

G0*: DIN rail mounting.
G1: Plate mounting.

SX: Approvals.

S0*: CE
S1: CE
CSA: Class I, Div.2, Grps A,B,C&D,T4
ATEX: II 3 G Ex nA II T4
TR CU: 2Ex nA II T4 X
№ TC RU C- US.ГБ05.B.00476
NANIO CCVE

DTM10-502-AX-CX-EXX-FXX-GX-SX

Factory configured for speed (built-in probe driver)

AX: Full Scale.

A0: 0 ~ 1,000 rpm
A1*: 0 ~ 3,600 rpm
A2: 0 ~ 6,000 rpm
A3: 0 ~ 10,000 rpm
A4: 0 ~ 30,000 rpm
A5: 0 ~ 50,000 rpm
A6: phase reference output
A7: phase reference output for digital condition monitoring

CX: Alarms.

C0*: Dual alarms with epoxy sealed relays
C1: No Alarm

EXX: Probe and Cable.

E00*: TM0180, 5m Cable
E01: TM0180, 9m Cable
E02: 8mm Probe, 3300, 5m Cable
E03: 8mm Probe, 3300, 9m Cable
E04: 8mm Probe, 7200, 5m Cable
E05: 8mm Probe, 7200, 9m Cable
E06: TM0105, 5m Cable
E07: TM0105, 9m Cable
E08: TM0110, 5m Cable
E09: TM0110, 9m Cable
E10: 11mm Probe, 3300, 5m Cable
E11: 11mm Probe, 3300, 9m Cable
E12: 11mm Probe, 7200, 5m Cable
E13: 11mm Probe, 7200, 9m Cable

FXX: Teeth per Revolution.

F01*: 1
FXX: Customer specify, number of teeth =XX

GX: Mounting.

G0*: DIN rail mounting.
G1: Plate mounting.

SX: Approvals.

S0*: CE
S1: CE
CSA: Class I, Div.2, Grps A,B,C&D,T4
ATEX: II 3 G Ex nA II T4
TR CU: 2Ex nA II T4 X
№ TC RU C- US.ГБ05.B.00476
NANIO CCVE

* Denote factory default.

Optional Accessories

DTM-CAL

The DTM field calibration kit is capable of calibrating any 5mm, 8mm, or 11mm probe system. The kit includes:

- ✓ DTM-CFG configuration and calibration software CD
- ✓ RS485-USB converter with cable
- ✓ TM0540 proximity probe field calibration kit

DTM-CFG-K

The DTM configuration and calibration software kit includes:

- ✓ DTM-CFG configuration and calibration software CD
- ✓ RS485-USB converter with cable

TM900

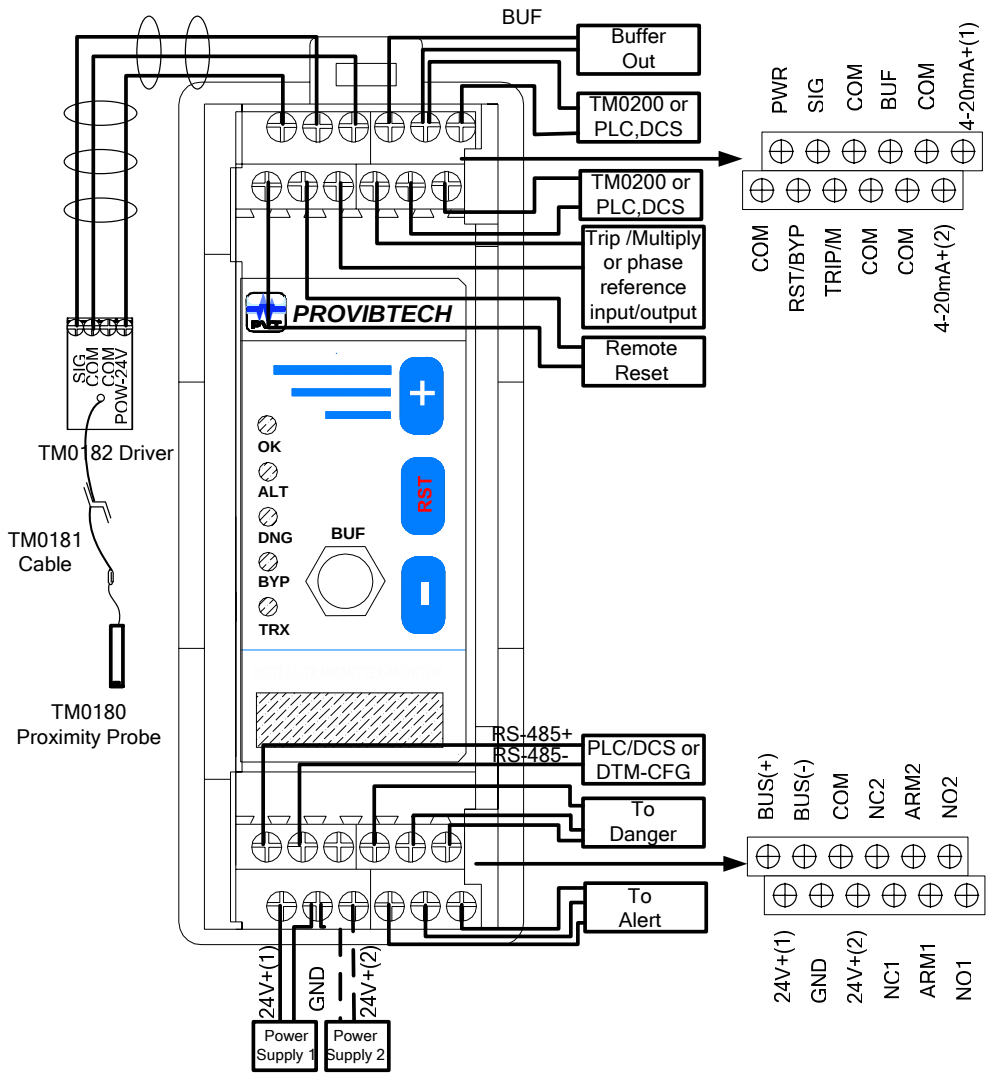
Power converter with isolation. Converts 95-250 VAC into 24VDC and is capable of powering up to five DTM modules.

Proximity Sensor Systems

- ✓ **TM0180:** 8mm probe
- ✓ **TM0105:** 5mm probe
- ✓ **TM0110:** 11mm probe
- ✓ **TM0181:** Extension cable
- ✓ **TM0182:** Probe driver
- ✓ **TM0120:** 25mm probe system

DTM10 System Installation

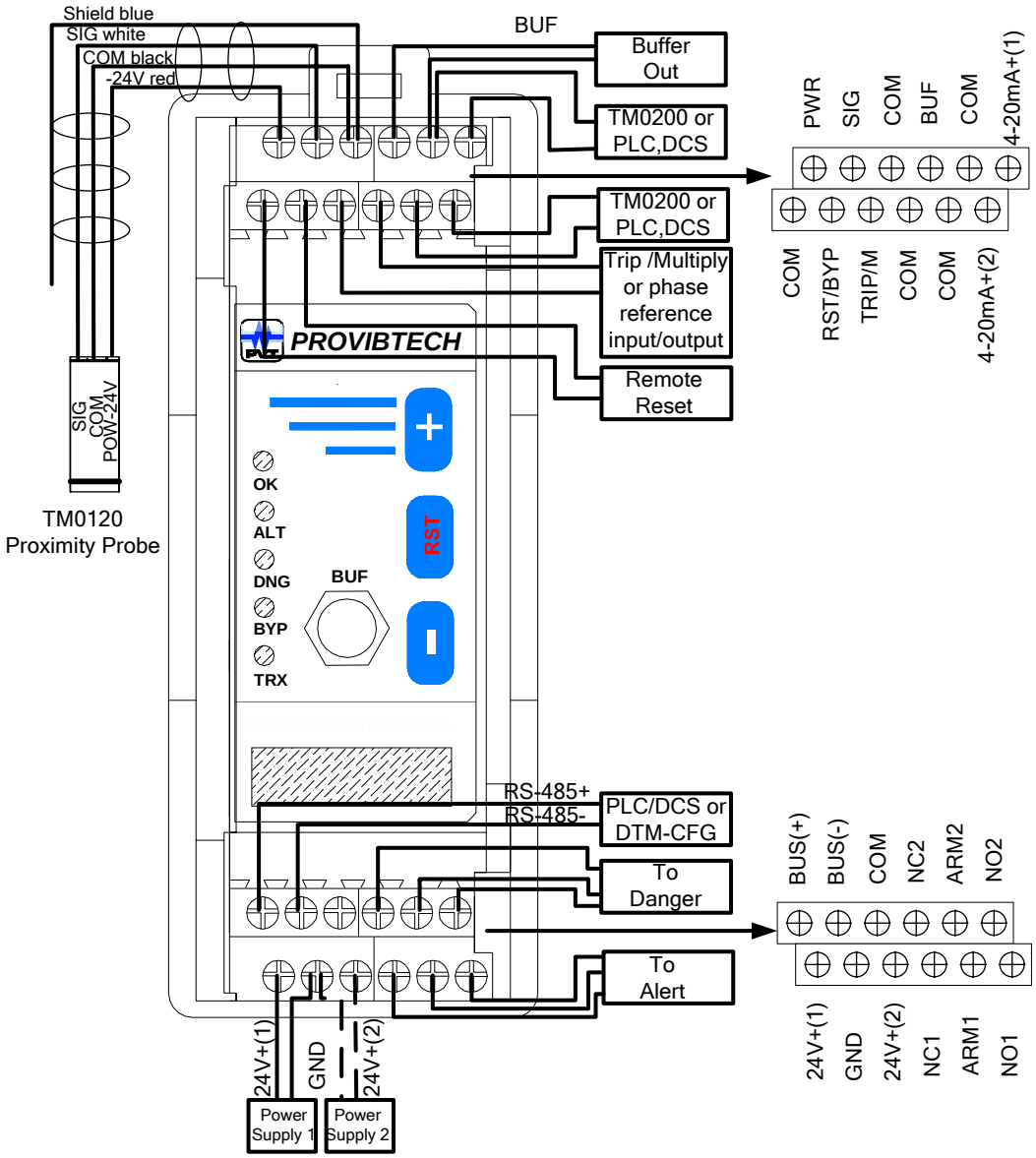
DTM10-201/202/501 Field-Wiring Diagram



Note:

- ✓ Power supply 2 and 4-20mA(2) are optional outputs used for redundancy.
- ✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- ✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- ✓ If the DTM10-201 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Moreover, the DTM10-201 won't provide Multiply Alarm function anymore, so you should set Multiply Alarm property to "None" by DTM-CFG software.
- ✓ If Full Scale of DTM10-501 is phase reference output for digital condition monitoring (A7), Trip/Multi terminal provides the phase reference signal for the DTM10-201, DTM10-301, DTM20-101 or DM200. A DTM10-501 can provide the phase reference signal for up to 6 DTMs or DM200s.

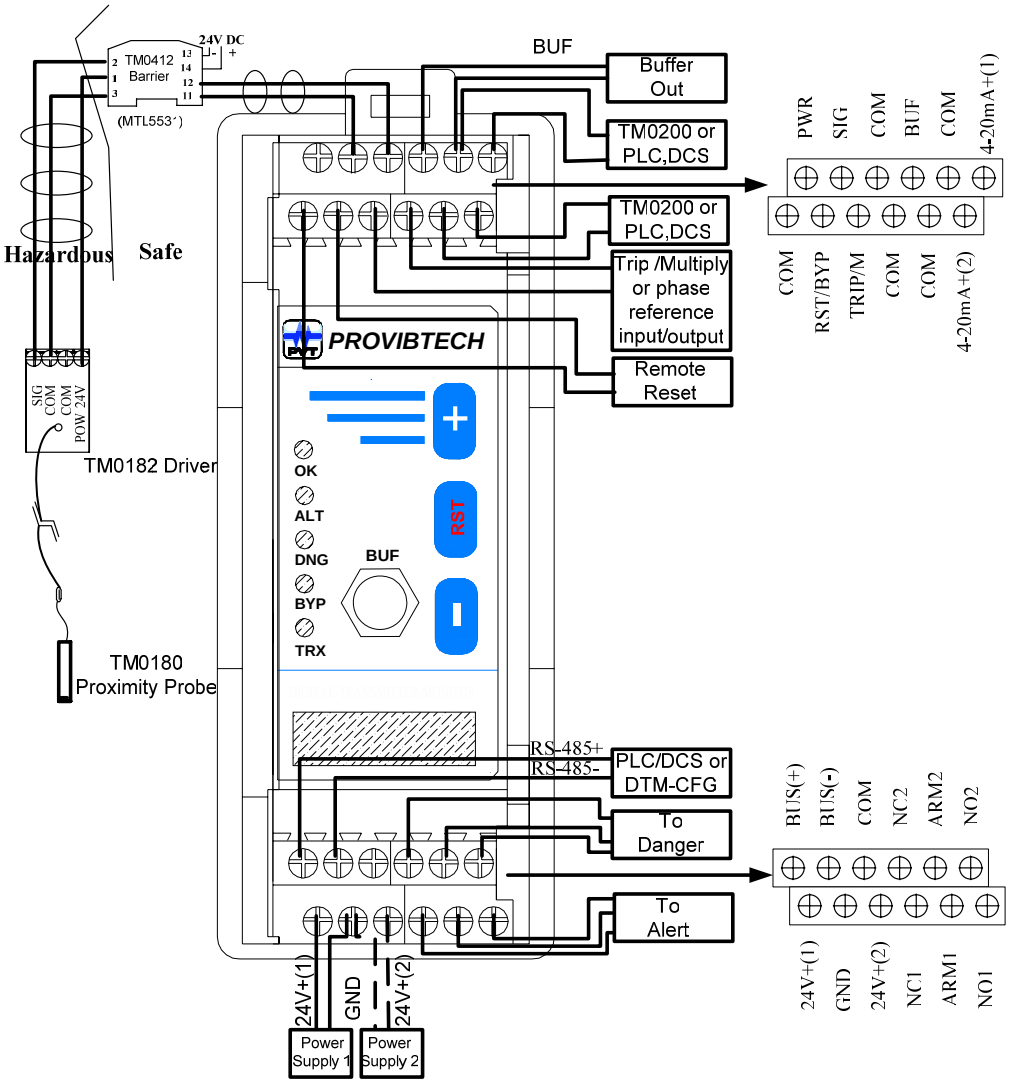
DTM10-201/202/501 Field-Wiring Diagram (Interfacing with TM0120)



Note:

- ✓ Power supply 2 and 4-20mA(2) are optional outputs used for redundancy.
- ✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- ✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.

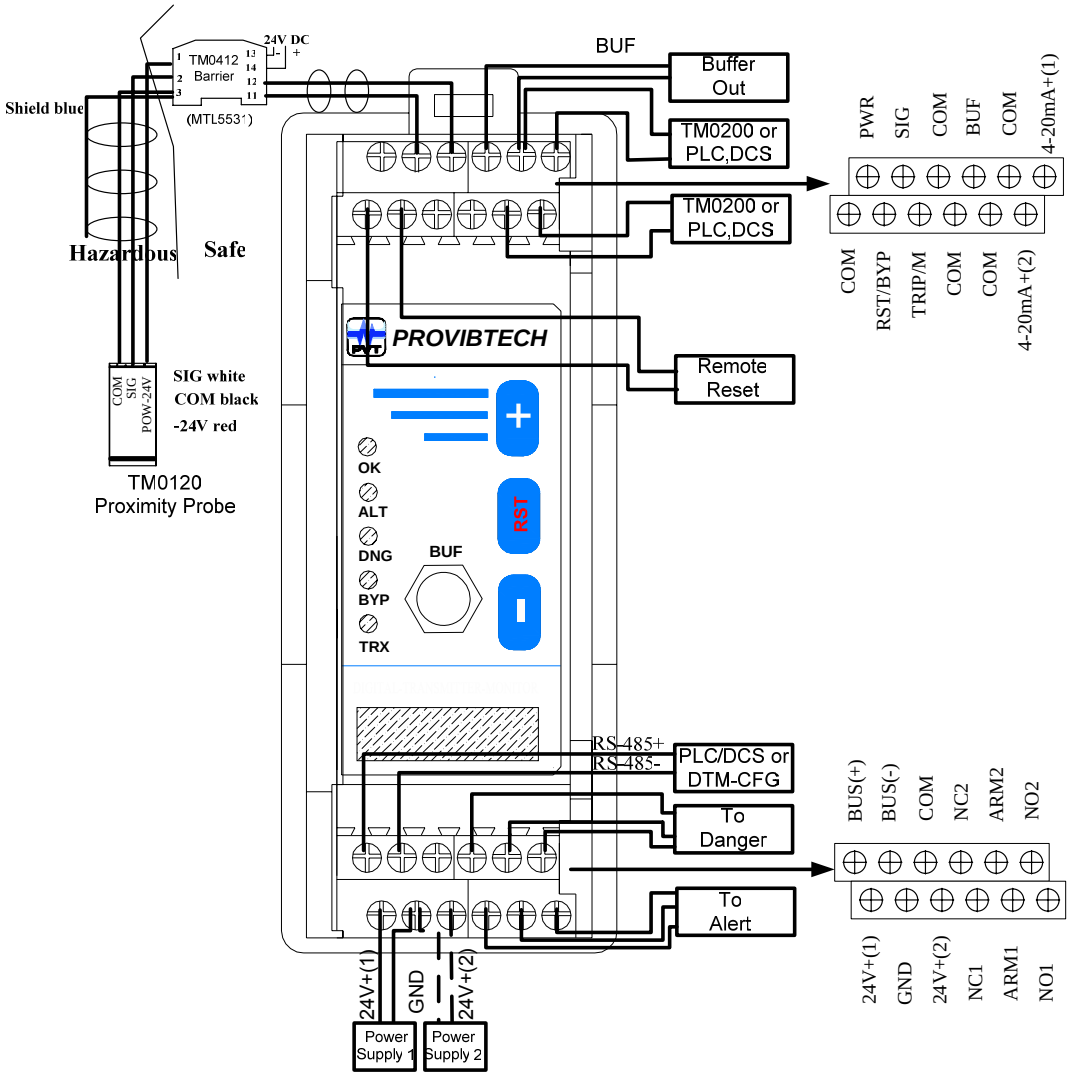
DTM10-201/202/501 Hazardous Area Field-Wiring Diagram



Note:

- ✓ Power supply 2 and 4-20mA(2) are optional outputs used for redundancy.
- ✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- ✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- ✓ If the DTM10-201 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Moreover, the DTM10-201 won't provide Multiply Alarm function anymore, so you should set Multiply Alarm property to "None" by DTM-CFG software.
- ✓ If Full Scale of DTM10-501 is phase reference output for digital condition monitoring (A7), Trip/Multi terminal provides the phase reference signal for the DTM10-201, DTM10-301, DTM20-101 or DM200. A DTM10-501 can provide the phase reference signal for up to 6 DTMs or DM200s.
- ✓ Other barriers available:
  TM0414: (STAHL 9002/00-260-138-001)

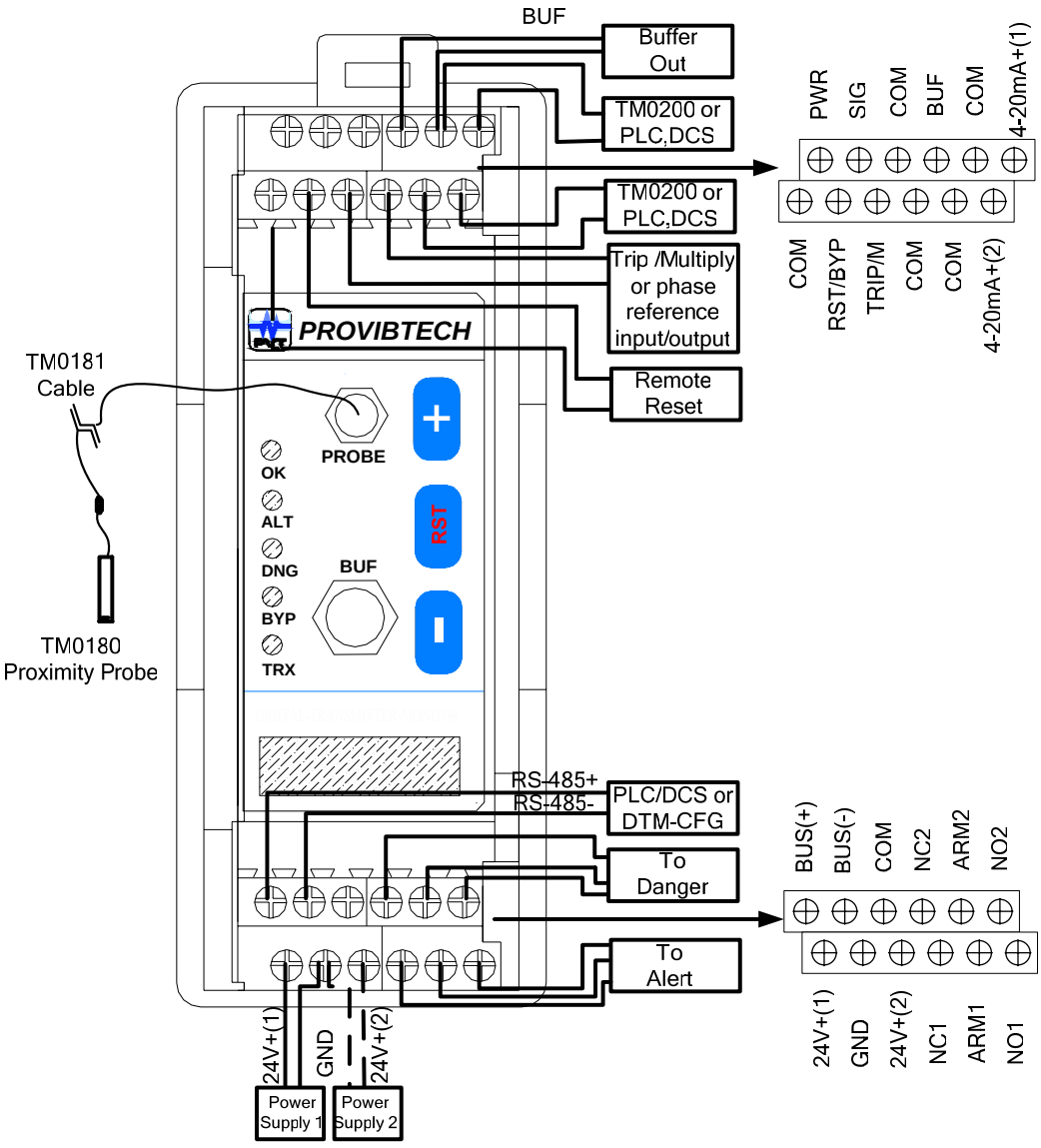
DTM10-201/202/501 Hazardous Area Field-Wiring Diagram (Interfacing with TM0120)



Note:

- ✓ Power supply 2 and 4-20mA(2) are optional outputs used for redundancy.
- ✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- ✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- ✓ Other barriers available:
  TM0414: (STAHL 9002/00-260-138-001)

DTM10-301/302/502 Field-Wiring Diagram



Note:

- ✓ Power supply 2 and 4-20mA(2) are optional outputs used for redundancy.
- ✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- ✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- ✓ If the DTM10-301 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Moreover, the DTM10-301 won't provide Multiply Alarm function anymore, so you should set Multiply Alarm property to "None" by DTM-CFG software.
- ✓ If Full Scale of DTM10-502 is phase reference output (A6), Buffer output terminal will provide phase reference signal.
- ✓ If Full Scale of DTM10-502 is phase reference output for digital condition monitoring (A7), Trip/Multi terminal provides the phase reference signal for the DTM10-201, DTM10-301, DTM20-101 or DM200. A DTM10-502 can provide the phase reference signal for up to 6 DTMs or DM200s.

Terminal description:

4-20MA(1)(2):	Transmission of overall value to upper-level PLC or DCS
BUF:	Buffered output or phase reference output
COM:	System ground
SIG:	External sensor input
NC1:	Alarm 1. Normally closed
ARM1:	Alarm 1. Arm
NO1:	Alarm1. Normally open
NC2:	Alarm2. Normally closed
ARM2:	Alarm 2. Arm
NO2:	Alarm 2. Normally open
PWR:	-24V output
BUS+, BUS-:	Modbus / Config digital communication ports
TRIP/MLTP:	Trip multiply (if shorted to COM) or phase reference input/output
RESET/BYP:	Alarms reset / Bypass
24V+(1),GND,24V+(2):	Dual input power supply

DTM10 Operation

DTM10 status

DTM10 will have the following status indication:

- ✓ Up to five LEDs flash for overall vibration status.
- ✓ Three key-presses can adjust some parameters.
- ✓ OK/TR/TX: green LED. The LED will flash when digital communications are active.
- ✓ ALERT: yellow LED
- ✓ DANGER/BYPASS: red LED

DTM10 field controls / interface

- ✓ Local reset: There is a “RESET” push button on the front panel of the DTM. Pushing the “RESET” button will reset any alarms that have occurred. Note: RESET only works when the current measured vibration is less than the alarm setpoint. If the vibration level is still above the setpoint then the unit will not be reset.
- ✓ Remote Reset / Bypass: Briefly shorting the RST/BYP terminal to COM will reset the system. A continuous short between the RST/BYP terminal and COM will disable (BYPASS) the alarms until the short is removed. (No alarms will be generated during BYPASS regardless of vibration levels)
- ✓ Trip Multiply: The Trip Multiply value can be set to Double Multiply or Triple Multiply in the DTM-CFG software. Shorting the Trip/Multi terminal to COM will cause the system alarm levels to increase by a factor of 2 or 3(only available for DTM10-201 / 301).
- ✓ Buffered output: a raw signal can be accessed at the BUF terminals or BNC connector. There is a 150 ohm output impedance. The output can drive up to 300 meters (1000 ft) in distance between a condition monitoring system and the DTM10.
- ✓ There are many more controls that can be accessed by using the DTM-CFG software. Check with the software user manual for more details (DTM-CFG-USR)

DTM10 alarm set-point configuration without software

The DTM10 alarm and danger set-points can be field configured with without software.

To get started:

- ✓ Power up the DTM system.
- ✓ Connect a current meter to the DTM 4-20mA (1) output terminals.

DTM10-201 / 301 Field Set-up

The DTM10-201 / 301 transmitters have been calibrated before leaving the factory. However, the DTM10-201 / 301 can also provide you with some field adjustment functions for zeroing the 4-20mA output and adjusting the Alarm and Danger setpoints.

Enter the setup & operation status Press the RESET button for 10 seconds. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing the entrance to setup status.

Zero Calibration: Press RESET again and the OK light begins to flash signifying the start of the Zero Calibration. At this point the user should press on + or – button until the output value changes to 4.0mA. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Zero calibration confirmed.

Alert setup: Press RESET again and the ALERT light begins to flash signifying the entrance to the Alert setpoint setup. The 4-20mA output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the ALARM setpoint.. For example, if you have a full scale of 0-10mils and you want your Alert setpoint to be 5 mils then you would press the + and / or – buttons until the output reads 12mA (50%).Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing ALERT value confirmed. Press on RESET again and enter into DANGER alarm point setup status.

DANGER setup: . Press RESET again and the DANGER light begins to flash signifying the entrance to the Danger setpoint setup. The 4-20mA output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the DANGER setpoint. Press + or – until desired point is met. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing DANGER value confirmed.

Exit cycle: Do not press on RESET within 10 seconds, CPU exits setup status.

FLASH LED	ZERO	Set Alert	Set Danger	Set Begin / End
OK	✓			✓
ALERT		✓		✓
DANGER			✓	✓
BYPASS				✓
TX/RX				✓

DTM10-202 / 302 Field Set-up

The DTM10-202 / 302 transmitters have been calibrated before leaving the factory. However, the DTM10-202 / 302 can also provide you with some field adjustment functions for calibrating the 4-20mA output and adjusting the Alarm and Danger setpoints.

Preparation Connect a current meter to the DTM 4-20mA (1) output. Connect the proximity probe to the DTM and install it in a static calibrator. Adjust the static shaker gap to 0.25mm (10mils).

Enter the setup & operation status Press the RESET button for 10 seconds. The OK, ALERT, DANGER, TR/X and BYPASS lights begin to flash, symbolizing the entrance to setup status.

Zero Calibration: Press the RESET button again. The OK light will flash signifying the start of the Zero calibration. Ensure that the static calibrator / probe gap is 0.25mm. At this time the user should press + or – button until the output value changes to 4.0mA； Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS begin to flash, symbolizing zero calibration confirmed.

Alert-H setup: Press the RESET button again. The ALERT light will flash signifying the start of the ALERT H adjustment. The 4-20mA output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the ALARM setpoint. For example, if you have a full scale of 10 to -10mils and you want your Alert setpoint to be 5 mils then you would press the + and / or – buttons until the output reads 16mA. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing ALERT-H value confirmed.

DANGER-H setup: Press the RESET button again. The DANGER light will flash signifying the start of the DANGER H adjustment. The 4-20mA output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the DANGER H setpoint. Press + or – until desired point is met. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing DANGER-H value confirmed.

Full scale point setup status: Adjust the static calibrator / probe gap to 2.25mm (90mils). Press RESET again. The BYPASS light will flash signifying the start of the Full Scale adjustment. Press the + or - button until the output reaches 20.0mA. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Full scale value confirmed.

Alert-L setup: Press RESET again. The OK and ALERT lights will flash together signifying the ALERT-L alarm point setup status. The 4-20mA output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the Alert L setpoint. For example, if you have a full scale of 10 to -10mils and you want your Alert L setpoint to be -5 mils then you would press the

+ and / or – buttons until the output reads 8mA. Press RESET again. the OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Alert L scale value confirmed.

DANGER-L setup: Press RESET again. The OK and DANGER lights will flash together signifying the DANGER-L alarm point setup status. The 4-20mA output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the DANGER L setpoint. Press + or – until desired point is met. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing DANGER-L value confirmed.

Exit cycle: Do not press RESET for 10 seconds and the CPU automatically exits setup status.

FLASH LED	ZERO	Set Alert-H	Set Danger-H	Set Full Scale	Set Alert-L	Set Danger-L	Set Begin / End
OK	✓				✓	✓	✓
ALERT		✓			✓		✓
DANGER			✓			✓	✓
BYPASS				✓			✓
TX/RX							✓

DTM10-501 / DTM10-502 Field Set-up

The DTM10-501 / 502 can also provide you with complete setpoint adjustment without using the configuration software.

Enter the setup & operation status Connect a current meter to the DTM 4-20mA (1) output. Press the RESET button for 10 seconds. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing the entrance to setup status.

Alert setup: Press the RESET button until only the Alert light flashes. The 4-20mA output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the Alert setpoint. For example, if you have a full scale of 0-1000 RPM and you want your Alert setpoint to be 500RPM then you would press the + and / or – buttons until the output reads 12mA (50%).

DANGER setup: Press the RESET button until only the Danger light flashes. . The 4-20mA output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the Danger setpoint. For example, if you have a full scale of 0-1000 RPM and you want your Danger setpoint to be 750RPM then you would press the + and / or – buttons until the output reads 16mA (75%).

Exit cycle: Do not press the RESET for 10 seconds and the CPU will automatically exit setup.

FLASH LED	Set Alert	Set Danger	Set End
OK			✓
ALERT	✓		✓
DANGER		✓	✓
BYPASS			✓
TX/RX			✓

DTM configuration with DTM-CFG software

The DTM-CFG configuration software gives access to more features than the front panel adjustment does. Consult the DTM-CFG user manual for more details concerning these capabilities.

DTM Modbus communication

The DTM supplies Modbus RTU communications for system interface with any upper level controller. The standard registers are listed below. For further registry and protocol information please contact your Provibtech office.

30501 Overall Vibration Level

30502 Gap Voltage (in mV)

10139 Status Bit (read only)

Bit 0=0/1	**Ok/ Not ok**
Bit 1=0/1	**Not Alert/ Alert**
Bit 2=0/1	**Not Danger/ Danger**
Bit 3=0/1	**Not Bypass/ Bypass**
Bit 4=0/1	**Not Trip Multiply/ Trip Multiply**

Note： The Overall Vibration Level is related to the full scale range and Modbus range. For example, if the Modbus range is 16384 and full scale range is 200um, then the current vibration measured value is 100um while the Modbus value is 8192. The Modbus range could be set with an integer from 1 to 32767, and the default is 16384.

DTM10 Maintenance

DTM10 calibration with DTM-CFG software

The DTM-CFG supply additional system calibrations to the customer. Some of these functions are listed below. Please see the DTM-CFG-USR software manual for more details.

- ✓ 4.0 mA calibration
- ✓ 20.0 mA calibration
- ✓ Buffer calibration
- ✓ A/D converter calibration（DTM10-201, DTM10-202）
- ✓ Linearization calibration (DTM10-301,DTM10-302)

DTM10 default communication setup

Baud Rate 9600bit/s
Parity Bit None
Stop Bit 2
ID 63
Modbus range 16384.

DTM10 communication and password reset

If the communication parameters (baud rate, parity, etc.) or password are forgotten or inadvertently changed they may be reset to factories defaults using the following procedure.

Power off DTM
Press and hold the + and - at the same time
Power on DTM,
Continue pressing on the + and - for about 10 seconds until all LEDs blink at the same time.

After above operations, DTM communication and password will reset to:

Baud Rate 9600bit/s
Parity Bit None
Stop Bit 2
ID 63
Configuration Password 1234

DTM20 Seismic Vibration Distributed Transmitter-Monitor

(Acceleration, Velocity, Displacement)

The DTM20 distributed Seismic vibration transmitter-monitor provides a simple and cost-effective solution for monitoring "balance-of-plant" equipment. The DTM's smart design is extremely reliable with redundancy in power supply inputs, 4-20mA outputs and relay outputs, as well as, a Modbus communication port. The DTM20 monitor can interface with almost any vibration sensor (accelerometer or velocity transducer). The DTM is fully digital and may be configured in the field or come pre-configured from the factory.

DTM20 Features

Designed with reliability

- Redundant power supplies
- Redundant 4-20mA outputs
- Dual dry-contact relay outputs
- Trip multiply and Bypass

Galvanic isolation for solid signal processing

- Power input isolation
- Sensor signal conditioning isolation
- Transmission 4-20mA output isolation
- Relay output isolation

Band-pass filter to further isolate unwanted noise

- Programmable sharp 8th-pole low-pass filter further eliminate high frequency band noise, thus obtains reliable vibration signal.

Fully field programmable by CFG software

- DTM20-CFG can easily change any configuration of the monitor.
- Calibration of the system is available with CFG software

Condition Monitoring by digital link

- Static (trend, overall, alarms, GAP, system OK)
- Dynamic (waveform, spectrum, phase reference, waterfall)
- Data will be directly transferred into server with no needs of additional interface hardware

MODBUS digital communication

- Build-in Modbus RTU digital communication
- More information from Modbus line

Work with variety of vibration sensors

- Accelerometer
- Velocity sensor
- Low frequency sensor
- Electro-magnetic velocity sensor

Backward compatible with TM101

- Field adjustment with on-monitor push button (without software)
  - ZERO calibration
  - Alert set point
  - Danger set point

Specifications

Electrical

Power Supply:

Redundant. Accept dual power input

22-30VDC @150mA

Isolation: 1000VDC power to signal conditioner circuit

Frequency Response (-3dB):

Nominal Frequency:

2 ~ 3KHz

Low Frequency:

0.5 ~ 100Hz

High Frequency:

10 – 20KHz (peak)

Filter:

Low-pass filter:

8-pole (160 dB per decade, 48 dB per octave)

100Hz to 10kHz, field programmed by CFG

High-pass filter:

2-pole (40 dB per decade, 12 dB per octave)

4 options (0.5Hz,2Hz,10Hz,100Hz) or custom

ICP Sensor Interface:

Sensitivity:

100mV/g

100mV/in/sec

4mV/um

or any sensitivity specified

Current Source

Nominal 4mA@24VDC

Seismic Velocity Sensor Interface:

Sensitivity:

User specified for any vibration sensor

Software programmable

Accuracy:

Typical +/-1% FS

Maximum +/-2% FS

Buffered Output:

Original vibration, un-filtered

Impedance: 150Ω

Maximum cable distance: 300m (1000ft)

Sensitivity: same as the sensor

Local BNC connection

Remote terminal connection

Overall Vibration:

Up to two 4-20mA output

4-20mA(1):

Source. Output to controller.

Non isolated

Maximum load resistance 500Ω

4-20mA(2):

Loop. Loop powered by controller.

Galvanic isolation, 1000VDC

Power supply range: 16-30VDC

Maximum load resistance: 50*(Vs-16)

Where Vs is the loop power supply

Alarm Setup:

0 ~ 100% FS

Accuracy: ±0.1%.

Relays:

Seal: Epoxy.

Capacity: 0.2A/240VAC,

0.4A/110VAC

2.0A/24VDC, resistive load

Relay type: SPTD

Isolation: 1000VDC

Push Buttons:

SET: System on-site calibration and alarm setting

+ : Adjustment increment

- : Adjustment decrement

LED Machine Condition Indicator:

OK: System OK indication

ALT: Vibration over Alert level

DNG: Vibration over Danger level

BYP: System in BYPASS

TRX: Digital transmission active

RESET/BYPASS:

Front panel push-button

Remote RESET/BYPASS terminals

Trip-Multiply

Double Multiply or Triple Multiply set in DTM-CFG

Short Trip/Multi terminal to COM terminal

System alarm level will increase by a factor of 2 or 3

Modbus:

RS485 Modbus RTU

Non-isolated (use DTM96 for isolation)

Software programming (DTM-CFG):

Alert and danger set-point, time delay

ZERO and Full-Scale calibration

Full-scale high and low setup

Low-pass filter corner frequency setup

Alarm latching/ non-latching, energized/ de-energized

Alarms programmable with alert, danger or system ok

Sensor selection and system calibration

Measurand / Integration changes: A, V, D

Modbus communication setup

Trip-multiply setup

Real-time bar-graph and alarms

3 layers of password protection

Digital Condition Monitoring

Terminals

RS485 for both Modbus RTU and condition monitoring

Software PCM360-LT

Work with PCM360-LT plant condition management software

Dynamic waveform:

Real-time vibration data, 2000 sets per data acquisition.

Alarms:

Up to 100 alarms can be stored in DTM20.

Trend:

Up to 1000 trend data can be stored in DTM20.

Spectrum:

Up to 800 lines of resolution

Physical

Dimension:

Height:	75mm (2.95″)
	see figure below
Weight:	2.0lb (1.0kg)

Environmental

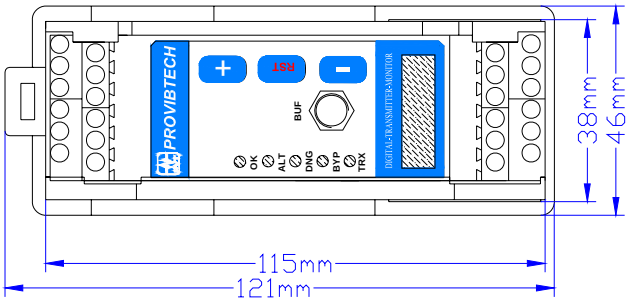
Temperature:

Operation:	-40℃ ~ +85℃.
Storage:	-50℃ ~ +100℃.
Humidity:	90% non-condensing.
Case:	Aluminum cast (copper free)

Certification

CE certified with EMI compliance

CSA:	Class I, Div. 2,Grps A,B,C&D,T4
ATEX:	II 3 G Ex nA II T4
TR CU:	2Ex nA II T4 X
	№ ТС RU C- US.ГБ05.В.00476
	NANIO CCVE



Rail Mounting

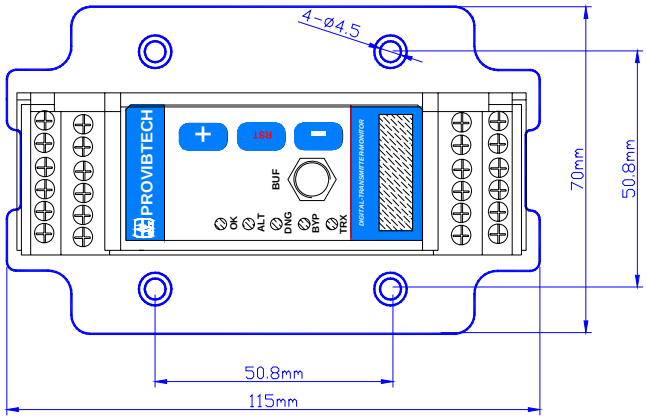
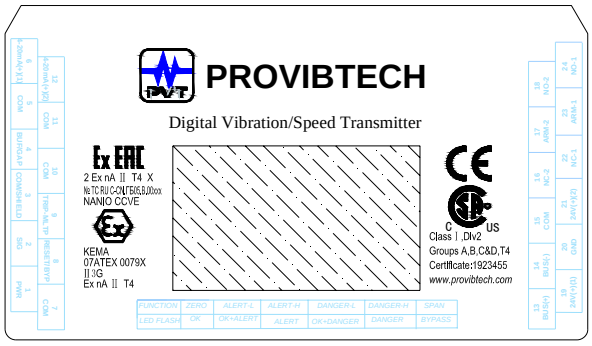


Plate Mounting

Hazardous area

Marking:



ATEX Standards:

EN 60079-0

EN 60079-15

Special condition in hazardous area:

- The ambient temperature range is: -40℃≤Ta≤70℃
- DTMs must be placed inside an enclosure that is in accordance with EN 60079-15:2005.
- Provisions must be made externally to prevent the rated voltage from being exceeded by transient disturbances of more than 40 %.

Ordering Information

DTM20-101-AXX-CX-GX-HX-IX -MX-SX

Factory configured seismic monitor

AXX: Full Scale.

A00: 0 - 200um pk-pk
A01: 0 - 500um pk-pk
A02: 0 - 100um pk-pk
A03: 0 - 250um pk-pk
A05: 0 - 125um pk-pk
A06*: 0 - 50mm/s pk
A07: 0 - 100mm/s pk
A08: 0 - 20mm/s pk
A11: 0 - 25mm/s pk
A12: 0 - 5.0g pk
A13: 0 - 10g pk
A14: 0 – 8mil pk-pk
A15: 0 – 20mil pk-pk
A16: 0 – 4mil pk-pk
A17: 0 – 10mil pk-pk
A18: 0 – 5mil pk-pk
A19: 0 – 2.0 ips pk
A20: 0 – 4.0 ips pk
A21: 0 – 0.8 ips pk
A22: 0 – 1.0 ips pk
A26: 0 - 50mm/s rms
A27: 0 - 100mm/s rms
A28: 0 - 20mm/s rms
A31: 0 - 25 mm/s rms
A32: 0 - 2.0 ips rms
A33: 0 - 4.0 ips rms
A34: 0 - 0.8 ips rms
A35: 0 - 1.0 ips rms
A36: 0 - 20g pk
A37: 0 - 50g pk

CX: Alarms.

C0*: Dual alarms with epoxy sealed relays.
C1: No Alarm.

GX: Mounting.

G0*: DIN rail mounting.
G1: Plate mounting.

HX: Sensor (not include).

H0*: TM0782A or any ICP accelerometer with 100mV/g (A00~A05 not available)
H1: TM0793V or any ICP velocity sensor with 4mV/mm/s (A12, 13, 36, 37 not applicable)
H2: TM079VD (A12, 13 not available)
HXXX: Seismic velocity sensor, Sensitivity = XXX mV/in/sec (A12, 13, 36, 37 not available)

IX: Frequency Response

I0*: Normal Frequency (4 ~ 3KHz, H2 not available)
I1: Low Frequency (0.5~100Hz)
I2: High frequency (10 – 20KHz, A12, A13 only with accelerometer)
IXXX-YYYY**:
XXX: Hi-pass filter; YYYY: low pass filter. (YYYY can be field programmable).

MX: Condition Monitoring, 4-20mA Galvanic Isolation***

M1*: 4-20mA without isolation. No CM
M2: 4-20mA without isolation . With CM
M3: 4-20mA with isolation. No CM
M4: 4-20mA with isolation. With CM
M5: Dual 4-20mA, No CM
M6: Dual 4-20mA, with CM

SX: Approvals.

S0*: CE
S1: CE
CSA: Class I, Div. 2,Grps A,B,C&D,T4
ATEX: II 3 G Ex nA II T4
TR CU: 2Ex nA II T4 X
№ TC RU C- US.ГБ05.B.00476
NANIO CCVE

* Denotes factory default.
** Low pass has to be 4X more than hi pass filter.
** Galvanic isolation requires loop powered configuration.

DTM20-AX-BX-IX -MX-SX

Distributed vibration monitor, fully field configurable, with Modbus RTU.

AX: Alarm and sensors.
- A0: ICP sensor, Dual alarms
- A1: ICP sensor, No alarm
- A2: Seismic velocity, Dual alarms
- A3: Seismic velocity, No alarm
- A4: Looseness monitoring, Dual alarms

BX: Mounting.
- B0: DIN rail mounting.
- B1: Plate mounting.

IX: Frequency response
- I0*: Normal/ High frequency
- I1: Low frequency
- I2: High frequency (10 – 20KHz, A12, A13,A36,A37 only with accelerometer)
- IXXX-YYYY**:
  XXX: Hi-pass filter; YYYY: low pass filter. (YYYY can be field programmable).

MX: Condition Monitoring, 4-20mA Galvanic Isolation***
- M1*: 4-20mA without isolation. No CM
- M2: 4-20mA without isolation . With CM
- M3: 4-20mA with isolation. No CM
- M4: 4-20mA with isolation. With CM
- M5: Dual 4-20mA, No CM
- M6: Dual 4-20mA, with CM

SX: Approvals.
- S0*: CE
- S1: CE
  CSA: Class I, Div. 2,Grps A,B,C&D,T4
  ATEX: II 3 G Ex nA II T4
  TR CU: 2Ex nA II T4 X
  № ТС RU C- US.ГБ05.В.00476
  NANIO CCVE

** Low pass has to be 4X more than hi pass filter.

** Galvanic isolation requires loop powered configuration.

.

Optional Accessories

DTM-CFG-K

The DTM configuration and calibration software kit includes:
- ✓ DTM-CFG configuration and calibration software CD
- ✓ RS485-USB converter with cable

TM900

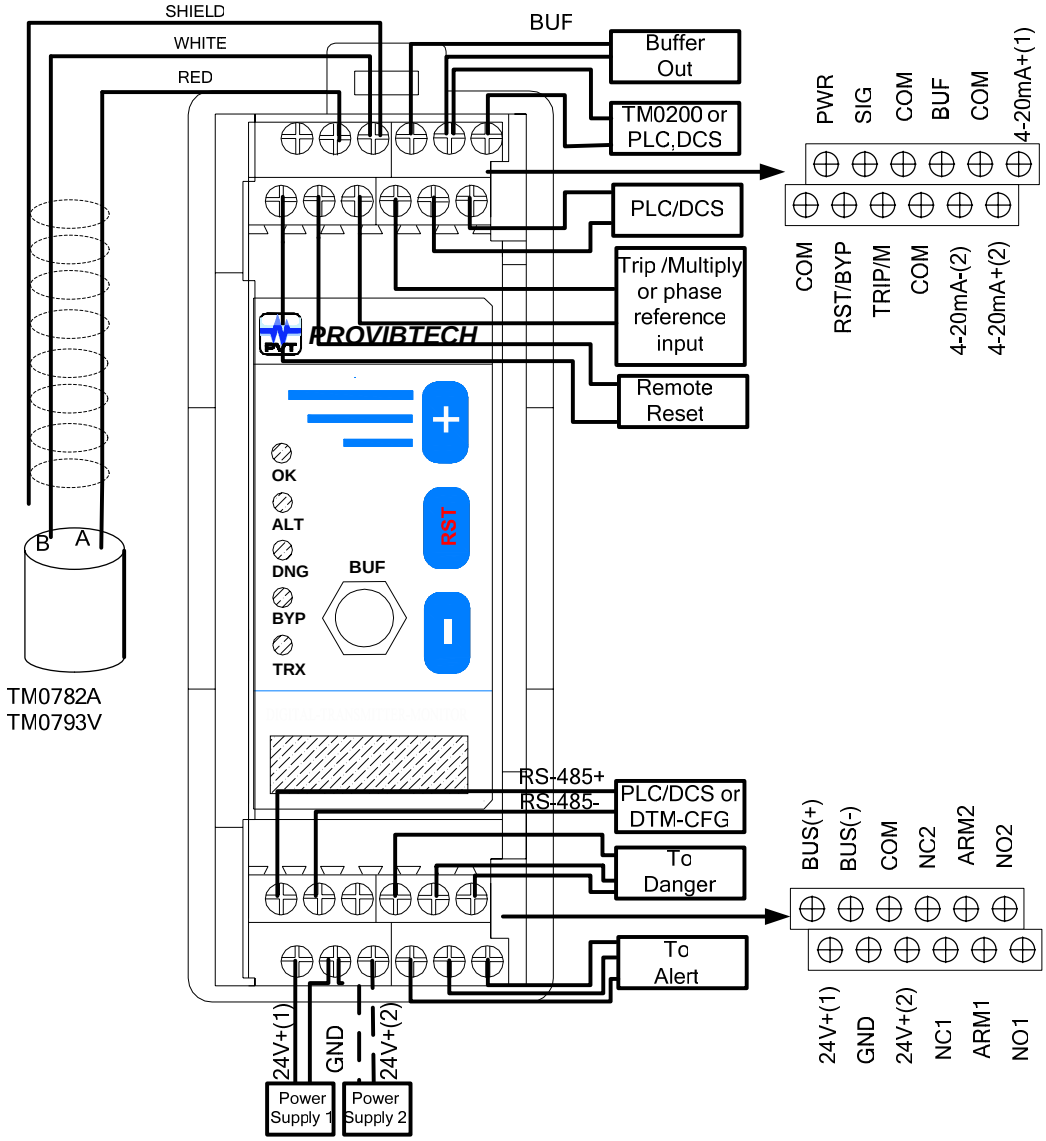
Power converter with isolation. Converts 95-250 VAC into 24VDC and is capable of powering up to five DTM modules.

Seismic Sensor Systems

- ✓ **TM0782A-K-M:** Accelerometer kit
- ✓ **TM0783A-K-M:** Accelerometer with cable
- ✓ **TM0793V-K-M:** Velocity sensor kit
- ✓ **TM079VD-V/H-K:** Low frequency sensor

DTM20 System Installation

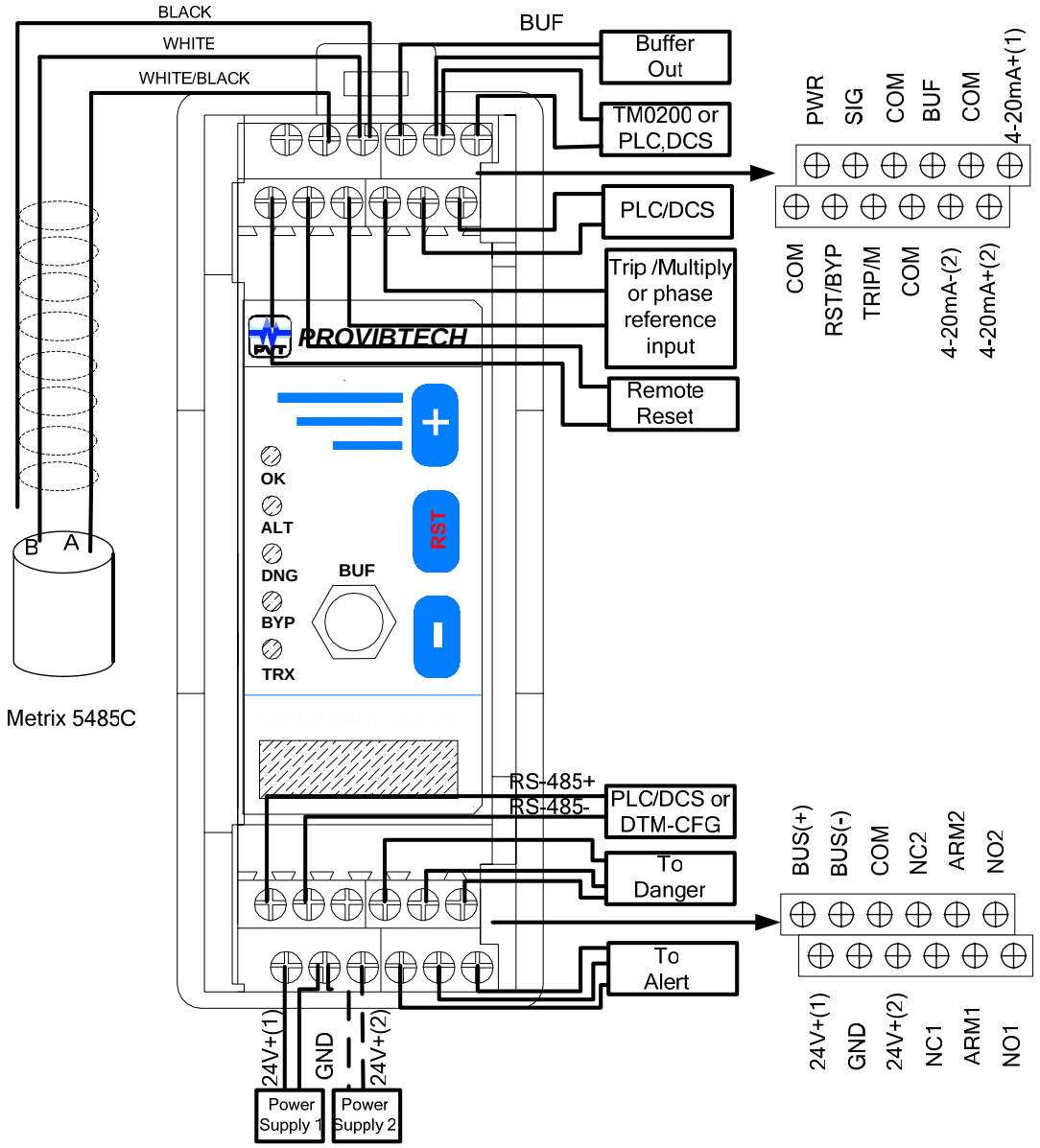
DTM20 Field-Wiring Diagram



Note:

- ✓ Power supply 2 and 4-20mA(2) are optional connections used for redundancy.
- ✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- ✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- ✓ If DTM20 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Thus, the DTM20 won't provide the Trip Multiply and the Trip Multiply property should be set to "None" in the DTM-CFG software.
- ✓ When using the signal condition monitoring function the DTM20 works with DTM10-501/502 to provide a phase reference output. In this case connect Trip/Multi of DTM20 with Trip/Multi of DTM10-501/502 and connect COM of DTM20 with COM of DTM10-501/502.

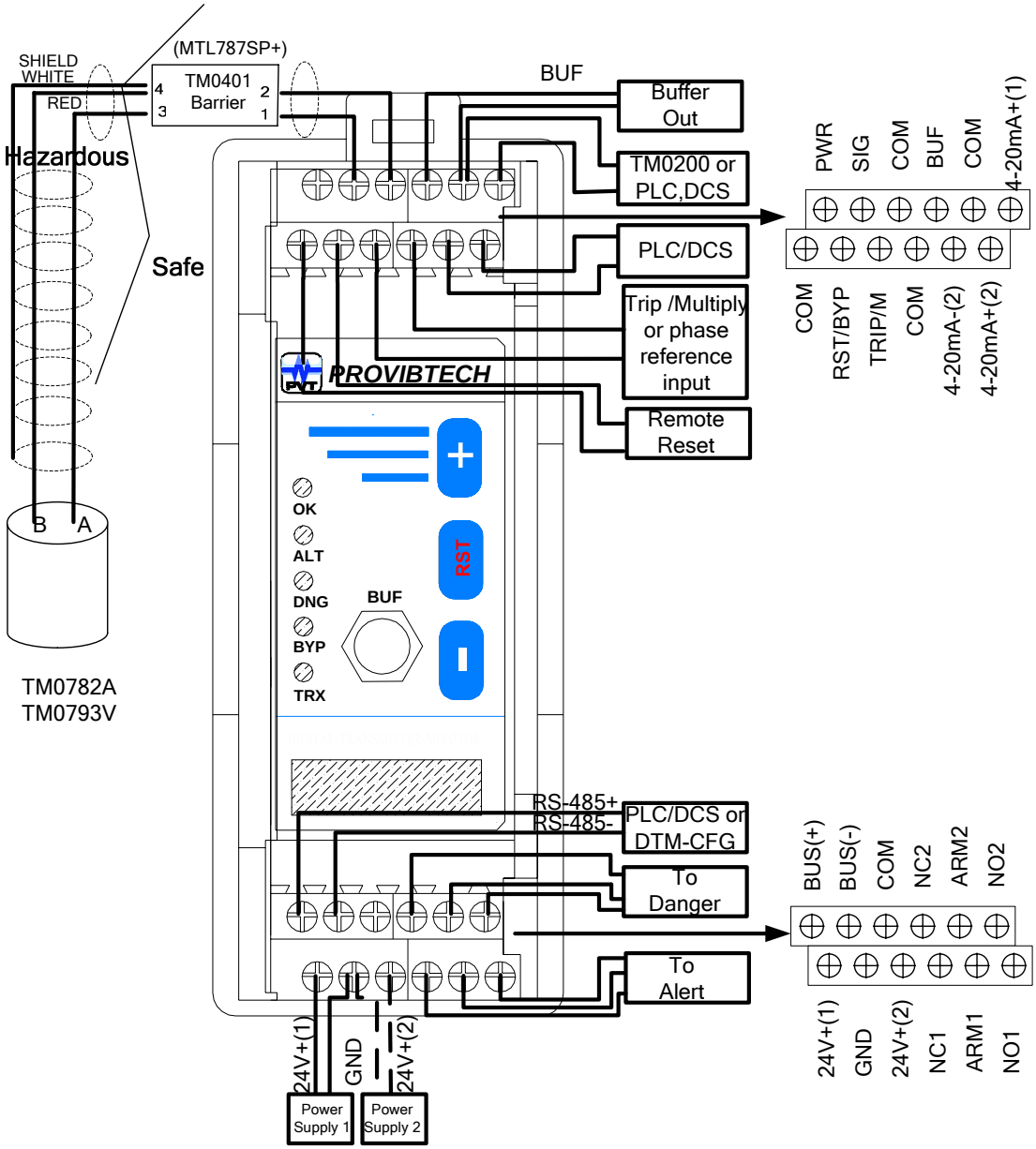
DTM20 Field-Wiring Diagram (Interfacing with 5485C)



Note:

- ✓ Power supply 2 and 4-20mA(2) are optional connections used for redundancy.
- ✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- ✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- ✓ If DTM20 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Thus, the DTM20 won't provide the Trip Multiply and the Trip Multiply property should be set to "None" in the DTM-CFG software.
- ✓ When using the signal condition monitoring function the DTM20 works with DTM10-501/502 to provide a phase reference output. In this case connect Trip/Multi of DTM20 with Trip/Multi of DTM10-501/502 and connect COM of DTM20 with COM of DTM10-501/502.

DTM20 Hazardous Area Field-Wiring Diagram



Note:

- ✓ Power supply 2 and 4-20mA(2) are optional connections used for redundancy.
- ✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- ✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- ✓ If DTM20 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Thus, the DTM20 won't provide the Trip Multiply and the Trip Multiply property should be set to "None" in the DTM-CFG software.
- ✓ When using the signal condition monitoring function the DTM20 works with DTM10-501/502 to provide a phase reference output. In this case connect Trip/Multi of DTM20 with Trip/Multi of DTM10-501/502 and connect COM of DTM20 with COM of DTM10-501/502.

Terminal Description:

4-20mA(1):	Transmission of overall value to upper-level PLC or DCS, sourced (loop power not required)
4-20mA(2):	Transmission of overall value to upper-level PLC or DCS, passive (loop power supply range: 16-30VDC)
BUF:	Buffered output
COM:	System ground
SIG:	External sensor input
NC1:	Alarm 1. Normally closed
ARM1:	Alarm 1. Arm
NO1:	Alarm1. Normally open
NC2:	Alarm2. Normally closed
ARM2:	Alarm 2. Arm
NO2:	Alarm 2. Normally open
PWR:	NC
BUS+, BUS-:	Modbus / Config digital communication ports
TRIP/MLTP:	Trip multiply (if shorted to COM) or phase reference input
RESET/BYP:	Alarms reset / Bypass
24V+(1),GND,24V+(2):	Dual input power supply

DTM20 Operation

DTM20 status

DTM20 will have the following status indication:

- ✓ Up to five LEDs flash for overall vibration status.
- ✓ Three key-presses can adjust some parameters.
- ✓ OK/TR/TX: green LED. The LED will flash when digital communications are active.
- ✓ ALERT: yellow LED
- ✓ DANGER/BYPASS: red LED

DTM20 field controls

- ✓ Local reset: There is a “RESET” push button on the front panel of the DTM. Pushing the “RESET” button will reset any alarms that have occurred. Note: RESET only works when the current measured vibration is less than the alarm setpoint. If the vibration level is still above the setpoint then the unit will not be reset.
- ✓ Remote reset / Bypass: Briefly shorting the RST/BYP terminal to COM will reset the system. A continuous short between the RST/BYP terminal and COM will disable (BYPASS) the alarms until the short is removed. (No alarms will be generated during BYPASS regardless of vibration levels)
- ✓ Trip Multiply: The Trip Multiply value can be set to Double Multiply or Triple Multiply in the DTM-CFG software. Shorting the Trip/Multi terminal to COM will cause the system alarm levels to increase by a factor of 2 or 3.
- ✓ Buffered output: a raw signal can be accessed by the BUF terminals or BNC connector. There is a 150 ohm output impedance. The output can drive up to 300 meters (1000 ft) in distance between a condition monitoring system and the DTM20.
- ✓ There are many more controls that can be accessed by using the DTM-CFG software. Check with the software user manual for more details (DTM-CFG-USR)

DTM20 alarm set-point configuration without software

The DTM20 alarm and danger set-points can be field configured without software.

To get started:

- ✓ Power up the DTM system.
- ✓ Connect a current meter to the DTM 4-20mA output terminals.

DTM20 Field Set-up

The DTM20 transmitters have been calibrated before leaving the factory. However, the DTM20 can also provide you with some field adjustment functions for zeroing the 4-20mA output and adjusting the Alarm and Danger setpoints.

Enter the setup & operation status Press the RESET button for 10 seconds. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing the entrance to setup status.

4-20mA(1) Zero Calibration: Press RESET again and the OK light begins to flash signifying the start of the 4-20mA(1) Zero Calibration. At this point the user should press on + or – button until the 4-20mA(1) output value changes to 4.0mA. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Zero calibration confirmed.

Alert setup: Press RESET again and the ALERT light begins to flash signifying the entrance to the Alert setpoint setup. The 4-20mA output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the ALARM setpoint.. For example, if you have a full scale of 0-10mils and you want your Alert setpoint to be 5 mils then you would press the + and / or – buttons until the output reads 12mA (50%).Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing ALERT value confirmed.

DANGER setup: . Press RESET again and the DANGER light begins to flash signifying the entrance to the Danger setpoint setup. The 4-20mA output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the DANGER setpoint. Press + or – until desired point is met. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing DANGER value confirmed.

4-20mA(2) Zero Calibration: Press RESET again and the BYPASS light begins to flash signifying the start of the 4-20mA(2) Zero Calibration. At this point the user should press on + or – button until the 4-20mA(2) output value changes to 4.0mA. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Zero calibration confirmed.

Exit cycle: Do not press on RESET within 10 seconds, CPU exits setup status.

FLASH LED	4-20mA(1) ZERO	Set Alert	Set Danger	4-20mA(2) ZERO	Set End
OK	√				√
ALERT		√			√
DANGER			√		√
BYPASS				√	√
TX/RX					√

DTM configuration with DTM-CFG software

The DTM-CFG configuration software gives access to more features than the front panel adjustment does. Consult the DTM-CFG user manual for more details concerning these capabilities.

DTM Modbus communication

The DTM supplies Modbus RTU communications for system interface with any upper level controller. The standard registers are listed below. For further registry and protocol information please contact your Provibtech office.

30501 Overall Vibration Level

30502 Gap Voltage (in mV)

10139 Status Bit (read only)

Bit 0=0/1	**Ok/ Not ok**
Bit 1=0/1	**Not Alert/ Alert**
Bit 2=0/1	**Not Danger/ Danger**
Bit 3=0/1	**Not Bypass/ Bypass**
Bit 4=0/1	**Not Trip Multiply/ Trip Multiply**

Note： The Overall Vibration Level is related to the full scale range and Modbus range. For example, if the Modbus range is 16384 and full scale range is 200um, then the current vibration measured value is 100um while the Modbus value is 8192. The Modbus range could be set with an integer from 1 to 32767, and the default is 16384.

DTM20 Maintenance

DTM20 calibration with DTM-CFG software

The DTM-CFG software supplies additional system calibrations to customer. Some of these functions are listed below. Please see the DTM-CFG-USR software manual for more details.

- ✓ 4.0 mA calibration
- ✓ 20.0 mA calibration
- ✓ A/D converter calibration

DTM20 default communication setup

Baud Rate 9600bit/s
Parity Bit No
Stop Bit 2
ID 63
Modbus range 16384.

DTM20 communication and password reset

If the communication parameters (baud rate, parity, etc.) or password are forgotten or inadvertently changed they may be reset to factories defaults using the following procedure.

Power off DTM
Press and hold the + and - at the same time
Power on DTM,
Continue pressing on the + and - for about 10 seconds until all LEDs blink at the same time.

After above operations, DTM communication and password will reset to:

Baud Rate 9600bit/s
Parity Bit None
Stop Bit 2
ID 63
Configuration Password 1234

DTM20-A4 Looseness Monitor

The DTM20-A4 is designed for monitoring reciprocating compressors & engines. It is a multiple parameter monitor with both impact monitoring and acceleration monitoring. Alarm can be the combination of these two parameters. You can conveniently decide the alarm level of each of the monitored parameters and setup accordingly. In addition to analog transmission, the monitor also supplies a digital output, dual alarms, and a condition monitoring. Thus greatly enhanced the analysis and monitoring capabilities of the system. The looseness monitor conform to ISO10816-6.

Looseness Monitor Unique Features

Precision Looseness Monitor

Programmable impact trigger level and time base.

Impact is set in acceleration (g's) with DTM-Config software.

Highly repeatable with quantitative measurement

Multiple parameters monitoring

Not only monitoring looseness impact but also overall acceleration

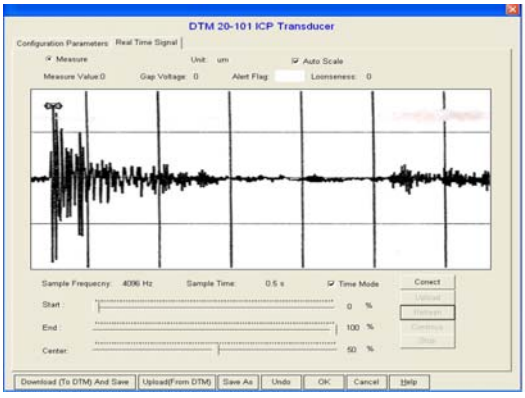
Both parameters can be monitored and alarmed

Multiple outputs

Analog transmission via dual 4-20mA

Digital Modbus RTU output

Waveform and spectrum (with software)



More accurate impact response

Industrial, light weight accelerometer (100mv/g -pk constant current) makes the measurement more responsive to high frequency and repeatable

Live waveform helps trigger level setting

Within the configuration process, the live waveform can be analyzed to decide the looseness trigger level thus minimize the "estimated" uncertainty

Designed with reliability

Redundant power supplies

Redundant 4-20mA outputs

Dual dry-contact relay outputs

Trip multiply and Bypass

Galvanic/optical isolation for solid signal processing

Power input isolation

Sensor signal conditioning isolation

Transmission 4-20mA output isolation

Relay output isolation

Digital output isolation with DTM96

Fully field programmable by CFG software

DTM20-CFG can easily change any configuration of the monitor.

Calibration of the system is available with CFG

Reciprocating condition monitoring by direct digital connection

Static registers (trend, overall, alarms, GAP, system OK)

Dynamic signal (waveform, spectrum, phase reference, waterfall)

Data will be directly transferred into server with no needs of additional interface hardware

MODBUS digital communication

Build-in Modbus RTU digital communication

More register information from Modbus

Specifications

Electrical

Power Supply:

Redundant. Accept dual power input

22-30VDC @150mA

Galvanic isolation: 1000VDC

Frequency Response:

100~1200rpm

Piezo Sensor Interface:

Sensitivity:

100mV/g -pk

Current Source

Nominal : 4mA@24VDC

Monitor Accuracy:

Typical +/-2% FS

Maximum +/-5% FS

Buffered Output:

Original vibration, un-filtered

Impedance: 150Ω

Maximum cable distance: 300m (1000ft)

Sensitivity: same as the sensor

Local BNC connector

On line CM terminals

Overall Vibration output:

Up to two 4-20mA outputs

4-20mA(1):

Source. Output to controller.

Non isolated

Maximum load resistance 500Ω

4-20mA(2):

Loop. Loop powered by controller.

Galvanic isolation, 1000VDC

Power supply range: 16-30VDC

Maximum load resistance: 50*(Vs-16)

Where Vs is the loop power supply

Alarm Setup:

0 ~ 100% FS

Accuracy: ±0.1%.

Relays:

Seal: Epoxy.

Capacity: 0.2A/240VAC,
0.4A/110VAC
2.0A/24VDC, resistive load

Relay type: SPTD

Isolation: 1000VDC

Push Buttons:

SET: System on-site calibration and alarm setting

+ : Adjustment increment

- : Adjustment decrement

LED Machine Condition Indicator:

OK: System OK indication

ALT: Vibration over Alert level

DNG: Vibration over Danger level

BYP: System in BYPASS

TRX: Digital transmission active

RESET/BYPASS:

Front panel push-button

Remote RESET/BYPASS terminals

DTM Distributed Transmitter-Monitor

Trip-Multiply

Double Multiply or Triple Multiply set in DTM-CFG

Short Trip/Multi terminal to COM terminal

System alarm level will increase by a factor of 2 or 3

Modbus:

RS485 Modbus RTU

Non-isolated (use DTM96 for isolation)

Software programming (DTM-CFG):

Alert and danger set-point, time delay

ZERO and Full-Scale calibration

Full-scale high and low setup

Alarm latching/ non-latching, energized/ de-energized

Alarms programmable with alert, danger or system ok

Sensor selection and system calibration

Modbus communication setup

Trip-multiply setup

Real-time bar-graph and alarms

3 layers of password protection

Digital Condition Monitoring

Terminals

RS485 for both Modbus RTU and condition monitoring

Software PCM360-LT

Work with PCM360-LT plant condition management software

Dynamic waveform:

Real-time vibration data, 2000 sets per data acquisition.

Alarms:

Up to 100 alarms can be stored in DTM20.

Trend:

Up to 1000 trend data can be stored in DTM20.

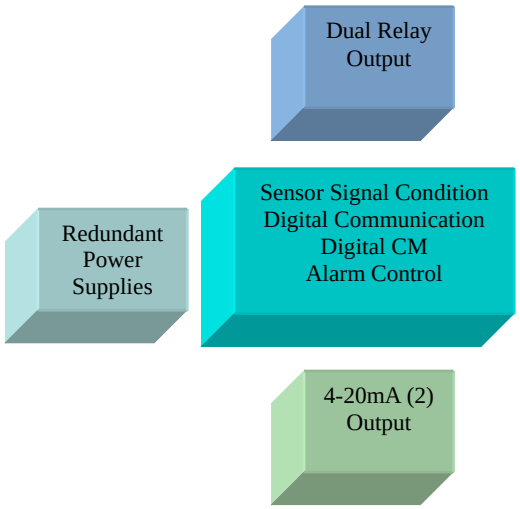
Spectrum:

Up to 800 lines of resolution

Physical

Dimension:

Height:	75mm (2.95″)
	see figure below
Weight:	2.0lb (1.0kg)



Building Block of DTM20
All modules are isolated
Digital output isolation via DTM96

Environmental

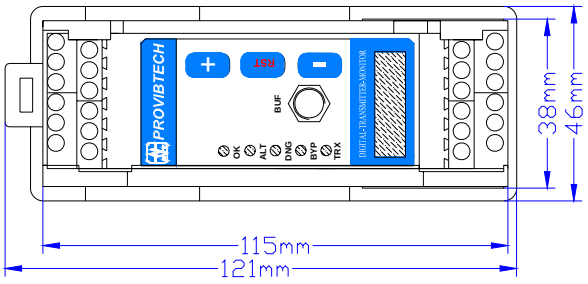
Temperature:

Operation:	-40℃ ~ +85℃.
Storage:	-50℃ ~ +100℃.
Humidity:	90% non-condensing.
Case:	Aluminum cast (copper free)

Certification

CE certified with EMI compliance

CSA:	Class I, Div. 2,Grps A,B,C&D,T4
ATEX:	II 3 G Ex nA II T4
TR CU:	2Ex nA II T4 X
	№ ТС RU C- US.ГБ05.B.00476
	NANIO CCVE



Rail Mounting

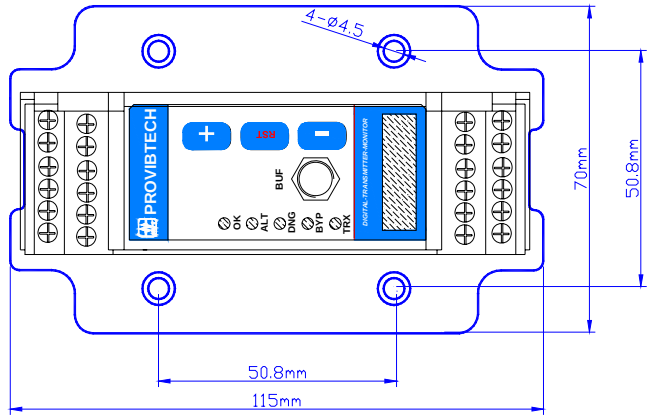
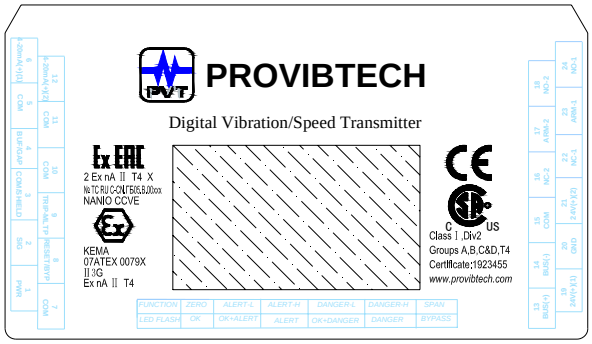


Plate Mounting

Hazardous area

Marking:



ATEX Standards:

EN 60079-0

EN 60079-15

Special condition in hazardous area:

- The ambient temperature range is: -40℃≤Ta≤70℃
- DTMs must be placed inside an enclosure that is in accordance with EN 60079-15:2005.
- Provisions must be made externally to prevent the rated voltage from being exceeded by transient disturbances of more than 40 %.

Ordering Information

DTM20-A4-B0-I2-MX-SX-TXXX

Looseness monitor, fully field configurable, with Modbus RTU.

MX: Condition Monitoring,

4-20mA with Optical Isolation*

M5*: Dual 4-20mA, no Condition monitoring

M6: Dual 4-20mA, with Condition monitoring

SX: Approvals.

S0*: CE

S1: CE

CSA: Class I, Div. 2,Grps A,B,C&D,T4

ATEX: II 3 G Ex nA II T4

TR CU: 2Ex nA II T4 X

№ TC RU C- US.ГБ05.B.00476

NANIO CCVE

TXXX: Running Speed

XXX: Running at XXX rpm

* Isolated 4-20mA requires external loop power.

Optional Accessories

DTM-CFG-K

The DTM configuration and calibration software kit includes:

- ✓ DTM-CFG configuration and calibration software CD
- ✓ RS485-USB converter with cable

TM900

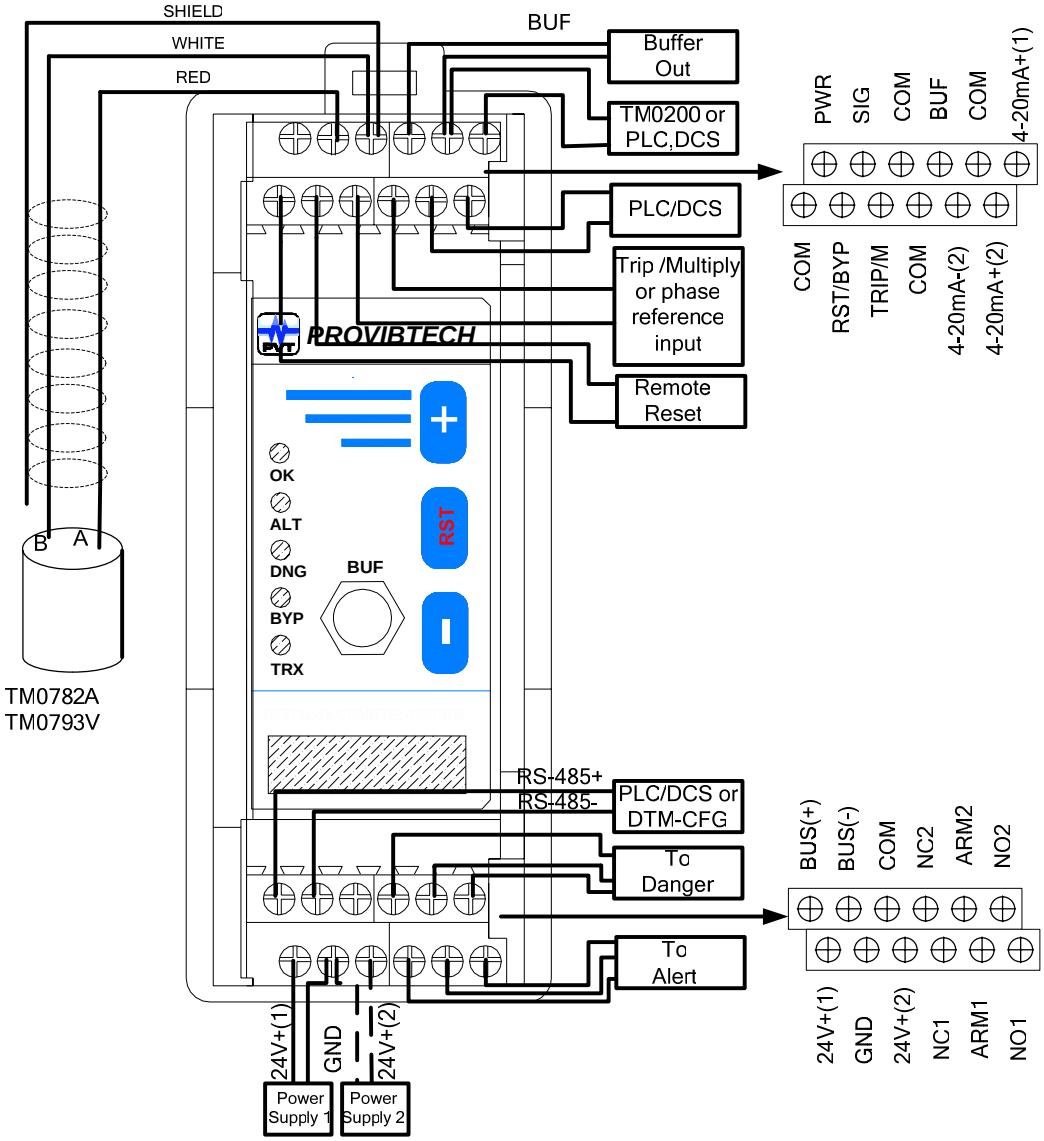
Power converter with isolation. Converts 95-250 VAC into 24VDC and is capable of powering up to five DTM modules.

Seismic Sensor Systems

- ✓ **TM0782A-K-M:** Accelerometer kit
- ✓ **TM0783A-K-M:** Accelerometer with cable
- ✓ **TM0793V-K-M:** Velocity sensor kit
- ✓ **TM079VD-V/H-K:** Low frequency sensor

DTM20-A4 System Installation

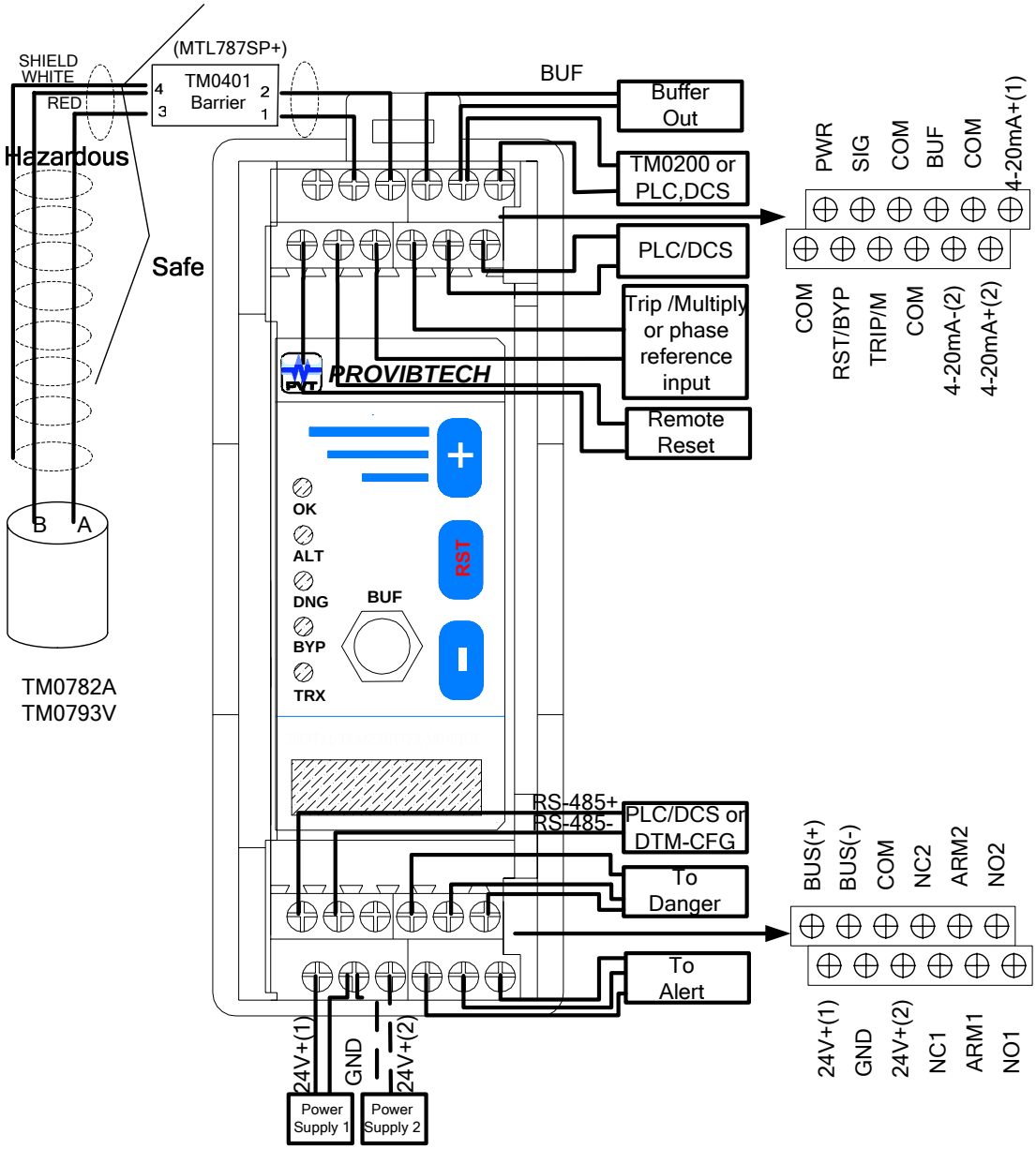
DTM20-A4 Field-Wiring Diagram



Note:

- ✓ Power supply 2 and 4-20mA(2) are optional connections used for redundancy.
- ✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- ✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- ✓ If DTM20 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Thus, the DTM20 won't provide the Trip Multiply and the Trip Multiply property should be set to "None" in the DTM-CFG software.
- ✓ When using the signal condition monitoring function the DTM20 works with DTM10-501/502 to provide a phase reference output. In this case connect Trip/Multi of DTM20 with Trip/Multi of DTM10-501/502 and connect COM of DTM20 with COM of DTM10-501/502.

DTM20-A4 Hazardous Area Field-Wiring Diagram



Note:

- ✓ Power supply 2 and 4-20mA(2) are optional connections used for redundancy.
- ✓ Alert and Danger relays are shown connected as normally open. Connect ARM and NC for normally closed.
- ✓ Connecting COM and RST/BYP with an external continuous or momentary closed switch will initiate a remote reset. Temporarily closing the switch will result in a system reset, continuous close will result in a system bypass.
- ✓ If DTM20 has the digital condition monitoring function, the Trip/Multi and COM pins are used for phase reference input. Thus, the DTM20 won't provide the Trip Multiply and the Trip Multiply property should be set to "None" in the DTM-CFG software.
- ✓ When using the signal condition monitoring function the DTM20 works with DTM10-501/502 to provide a phase reference output. In this case connect Trip/Multi of DTM20 with Trip/Multi of DTM10-501/502 and connect COM of DTM20 with COM of DTM10-501/502.

Terminal Description:

4-20mA(1):	Transmission of overall value to upper-level PLC or DCS, sourced (loop power not required)
4-20mA(2):	Transmission of overall value to upper-level PLC or DCS, passive (loop power supply range: 16-30VDC)
BUF:	Buffered output
COM:	System ground
SIG:	External sensor input
NC1:	Alarm 1. Normally closed
ARM1:	Alarm 1. Arm
NO1:	Alarm1. Normally open
NC2:	Alarm2. Normally closed
ARM2:	Alarm 2. Arm
NO2:	Alarm 2. Normally open
PWR:	NC
BUS+, BUS-:	Modbus / Config digital communication ports
TRIP/MLTP:	Trip multiply (if shorted to COM) or phase reference input
RESET/BYP:	Alarms reset / Bypass
24V+(1),GND,24V+(2):	Dual input power supply

DTM20-A4 Operation

DTM20-A4 status

DTM20 will have the following status indication:

- ✓ Up to five LEDs flash for overall vibration status.
- ✓ Three key-presses can adjust some parameters.
- ✓ OK/TR/TX: green LED. The LED will flash when digital communications are active.
- ✓ ALERT: yellow LED
- ✓ DANGER/BYPASS: red LED

DTM20-A4 field controls

- ✓ Local reset: There is a “RESET” push button on the front panel of the DTM. Pushing the “RESET” button will reset any alarms that have occurred. Note: RESET only works when the current measured vibration is less than the alarm setpoint. If the vibration level is still above the setpoint then the unit will not be reset.
- ✓ Remote reset / Bypass: Briefly shorting the RST/BYP terminal to COM will reset the system. A continuous short between the RST/BYP terminal and COM will disable (BYPASS) the alarms until the short is removed. (No alarms will be generated during BYPASS regardless of vibration levels)
- ✓ Trip Multiply: The Trip Multiply value can be set to Double Multiply or Triple Multiply in the DTM-CFG software. Shorting the Trip/Multi terminal to COM will cause the system alarm levels to increase by a factor of 2 or 3.
- ✓ Buffered output: a raw signal can be accessed by the BUF terminals or BNC connector. There is a 150 ohm output impedance. The output can drive up to 300 meters (1000 ft) in distance between a condition monitoring system and the DTM20.
- ✓ There are many more controls that can be accessed by using the DTM-CFG software. Check with the software user manual for more details (DTM-CFG-USR)

DTM20-A4 alarm set-point configuration without software

The DTM20 alarm and danger set-points can be field configured without software.

To get started:

- ✓ Power up the DTM system.
- ✓ Connect two current meters to the DTM 4-20mA(1) and 4-20mA(2) output terminals.

DTM20-A4 Field Set-up

The DTM20-A4 Looseness Monitors have been calibrated before leaving the factory. However, the Looseness Monitors can also provide you with some field adjustment functions for zeroing the 4-20mA output and adjusting the Alarm and Danger setpoints.

Enter the setup & operation status Press the RESET button for 10 seconds. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing the entrance to setup status.

4-20mA(1) Zero Calibration: Press RESET again and the OK light begins to flash signifying the start of the 4-20mA(1) Zero Calibration. At this point the user should press on + or – button until the 4-20mA(1) output value changes to 4.0mA. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Zero calibration confirmed.

Acceleration alert setup: Press RESET again and the ALERT light begins to flash signifying the entrance to the Acceleration alert setpoint setup. The 4-20mA(1) or 4-20mA(2) (determined by the 4-20mA output setup) output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the ALARM setpoint. For example, if you have a full scale of 0-10g and you want your Alert setpoint to be 5g then you would press the + and / or – buttons until the output reads 12mA (50%).Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Acceleration alert value confirmed.

Acceleration danger setup: . Press RESET again and the DANGER light begins to flash signifying the entrance to the Acceleration danger setpoint setup. The 4-20mA(1) or 4-20mA(2) (determined by the 4-20mA output setup) output now corresponds to a percentage of full scale (4mA = 0% and 20mA = 100% of full scale) according to the DANGER setpoint. Press + or – until desired point is met. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Acceleration danger value confirmed.

4-20mA(2) Zero Calibration: Press RESET again and the BYPASS light begins to flash signifying the start of the 4-20mA(2) Zero Calibration. At this point the user should press on + or – button until the 4-20mA(2) output value changes to 4.0mA. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Zero calibration confirmed.

Looseness alert setup: Press RESET again. The OK and ALERT light begins to flash signifying the entrance to the Looseness alert setpoint setup. The 4-20mA(1) or 4-20mA(2) (determined by the 4-20mA output setup) output now corresponds to the Looseness alert setpoint (4mA = 0% and 20mA = 100%). For example, if you want your Looseness alert setpoint to be 50% then you would press the + and / or – buttons until the output reads 12mA.Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Looseness alert value confirmed.

Looseness danger setup: . Press RESET again. The OK and DANGER light begins to flash signifying the entrance to the Looseness Danger setpoint setup. The 4-20mA(1) or 4-20mA(2) (determined by the 4-20mA output setup) output now corresponds to the Looseness Danger setpoint (4mA = 0% and 20mA = 100%). Press + or – until desired point is met. Press RESET again. The OK, ALERT, DANGER, TR/RX and BYPASS lights begin to flash, symbolizing Looseness Danger value confirmed.

Exit cycle: Do not press on RESET within 10 seconds, CPU exits setup status.

FLASH LED	4-20mA(1) ZERO	Acceleration alert setup	Acceleration danger setup	4-20mA(2) ZERO	Looseness alert setup	Looseness danger setup	Set End
OK	√				√	√	√
ALERT		√			√		√
DANGER			√			√	√
BYPASS				√			√
TX/RX							√

DTM configuration with DTM-CFG software

The DTM-CFG configuration software gives access to more features than the front panel adjustment does. Consult the DTM-CFG user manual for more details concerning these capabilities.

DTM Modbus communication

The DTM supplies Modbus RTU communications for system interface with any upper level controller. The standard registers are listed below. For further registry and protocol information please contact your Provibtech office.

30501 Overall Vibration Level

30502 Gap Voltage (in mV)

10139 Status Bit (read only)

Bit 0=0/1	**Ok/ Not ok**
Bit 1=0/1	**Not Alert/ Alert**
Bit 2=0/1	**Not Danger/ Danger**
Bit 3=0/1	**Not Bypass/ Bypass**
Bit 4=0/1	**Not Trip Multiply/ Trip Multiply**

Note：The Overall Vibration Level is related to the full scale range and Modbus range. For example, if the Modbus range is 16384 and full scale range is 200um, then the current vibration measured value is 100um while the Modbus value is 8192. The Modbus range could be set with an integer from 1 to 32767, and the default is 16384.

DTM20-A4 Maintenance

DTM20-A4 calibration with DTM-CFG software

The DTM-CFG software supplies additional system calibrations to customer. Some of these functions are listed below. Please see the DTM-CFG-USR software manual for more details.

- ✓ 4.0 mA calibration
- ✓ 20.0 mA calibration
- ✓ A/D converter calibration

DTM20-A4 default communication setup

Baud Rate 9600bit/s
Parity Bit No
Stop Bit 2
ID 63
Modbus range 16384.

DTM20-A4 communication and password reset

If the communication parameters (baud rate, parity, etc.) or password are forgotten or inadvertently changed they may be reset to factories defaults using the following procedure.

Power off DTM
Press and hold the + and - at the same time
Power on DTM,
Continue pressing on the + and - for about 10 seconds until all LEDs blink at the same time.

After above operations, DTM communication and password will reset to:

Baud Rate 9600bit/s
Parity Bit None
Stop Bit 2
ID 63
Configuration Password 1234

DTM96 Communication Module

The DTM96 functions as an RS232 to RS485 converter and / or enables (32) DTM modules to be networked together via Modbus. Combined with the DTM-CFG configuration software, the DTM96 truly provides a distributed vibration system. The Modbus interface enables users to remotely monitor, configure, and calibrate the DTMs.

DTM96 Features

- ✓ **Direct Modbus RTU interface**
- ✓ **Optically isolated RS485, RS422, and RS232 communications**
- ✓ **Communicate with the DTM using your computers RS232 connection**
- ✓ **Provides galvanic isolation between PC and DTM**

Specifications

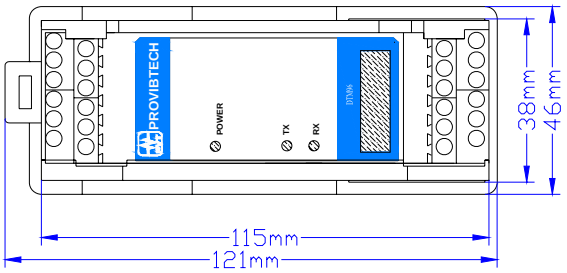
Electrical

Power Supply:	22-30VDC, 150mA Galvanic isolation
Modbus:	Modbus RTU RS485 and RS232 Galvanically Isolated
	Modbus TCP RJ45 Ethernet connection Galvanically Isolated

Physical

Dimension:

Height:	75mm (2.95″) see figure below.
Weight:	1.0lb (0.5kg).



Rail Mounting

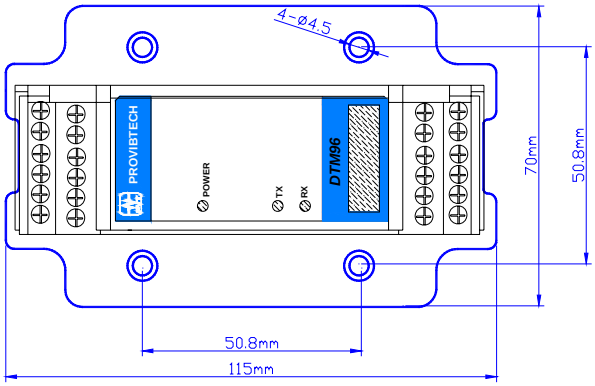


Plate Mounting

Environmental

Temperature:	
Operation:	-40℃ ~ +85℃ .
Storage:	-50℃ ~ +100℃ .
Humidity:	90% non-condensing.
Case:	Aluminum

Certification

CE certified with EMI compliance

CSA: Class I, Div. 2,Grps A,B,C&D,T4

ATEX: II 3 G Ex nA II T4

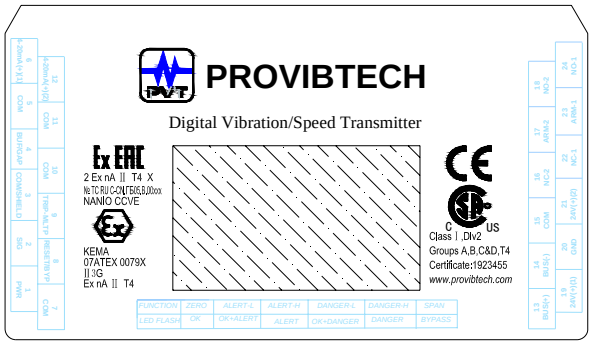
TR CU: 2Ex nA II T4 X

№ ТС RU C- US.ГБ05.В.00476

NANIO CCVE

Hazardous area

Marking:



ATEX Standards :

EN 60079-0

EN 60079-15

Special condition in hazardous area:

- The ambient temperature range is: -40℃≤Ta≤70℃
- DTMs must be placed inside an enclosure that is in accordance with EN 60079-15:2005.
- Provisions must be made externally to prevent the rated voltage from being exceeded by transient disturbances of more than 40 %.

Ordering Information

DTM96-AX-BX-SX

DTM interface module with RS485 and RS232.

AX: Output

A0*: Modbus RS485, RS232, RS422

BX: Mounting

B0*: DIN rail mounting

B1: Plate mounting

SX: Approvals

S0*: CE

S1: CE certified with EMI compliance
CSA: Class I, Div. 2,Grps A,B,C&D,T4
ATEX: II 3 G Ex nA II T4
TR CU: 2Ex nA II T4 X
№ ТС RU C- US.ГБ05.В.00476
NANIO CCVE

* Denotes factory default.

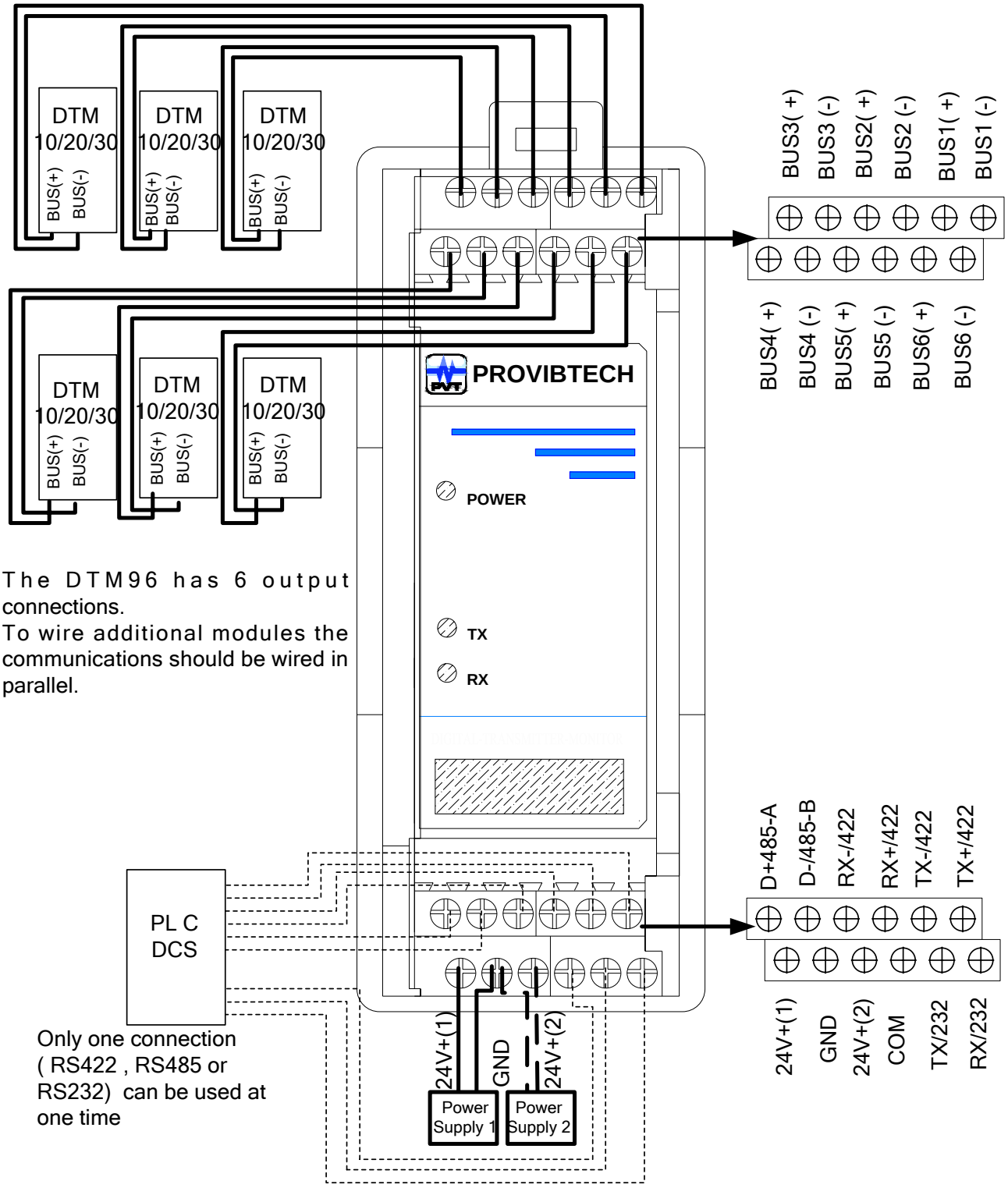
Optional Accessories

TM900

Power converter with isolation. It converts 95-250 VAC into 24VDC and is capable of powering up to five DTM modules.

DTM96 System Installation

Installation – field-wiring diagram



The DTM96 has 6 output connections.
To wire additional modules the communications should be wired in parallel.

Only one connection (RS422 , RS485 or RS232) can be used at one time

Terminal description:

BUS+: RS485+ output
BUS-: RS485- output

24V+(1),GND,24V+(2): Input power supply

D+/485-A, D-/485-B: RS485 digital communication ports input

COM, TX/232, RX/232: RS232 digital communication ports input

RX-/422, RX+/422, TX-/422, TX+/422: RS422 digital communication ports input

DTM96 status Indicators

The DTM96 will have the following status indicators:

- ✓ TX: green LED. Flashes when communications are active.
- ✓ RX: green LED. Flashes when communications are active.
- ✓ Power: green LED.

Accessories I

TM900 Power Converter

Reliable Power Converter

The TM900 power converter is designed specifically for the DTM series transmitter-monitor. Each TM900 can supply power for up to five DTM series transmitter-monitors. The 24Vdc output of the power converter is isolated from its input and is short circuit protected.

Specifications

Electrical

AC Power Input:	90~250VAC
Power Output:	Voltage: 24VDC±5%.
Current:	< 750mA.
Isolation:	1000VAC.
Fuse:	2.0A, 250VAC.

Physical

Dimension:	
Height:	75mm (2.95″)
	see figure below
Weight:	1.0kg (2.0 lb)

Environmental

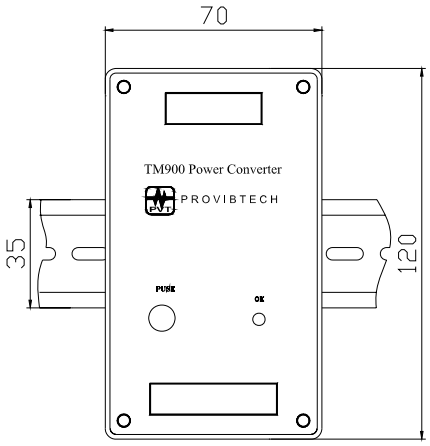
Temperature:	
Operation:	-40℃ ~ +85℃.
Storage:	-50℃ ~ +100℃.
Humidity:	90% non-condensing.

Ordering Information

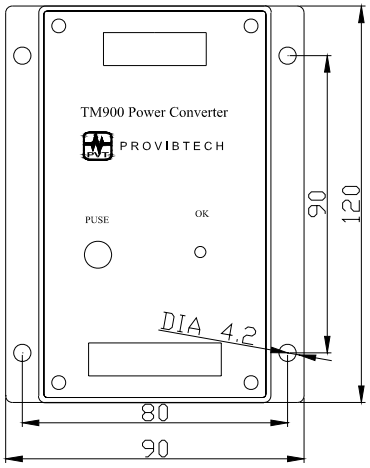
TM900–GX

GX: Mounting.

G0*: 35mm DIN rail mounting.
G1: Plate mounting.



TM900 DIN Rail Mounting



TM900 Plate Mounting

Accessories II

DTM-CFG

Configuration and calibration software

DTM RS485-USB

Converter from RS485 to USB for configuration with laptop computer

DTM RS485-RS232

Converter from RS485 to RS232 for configuration with desktop computer

PCM370

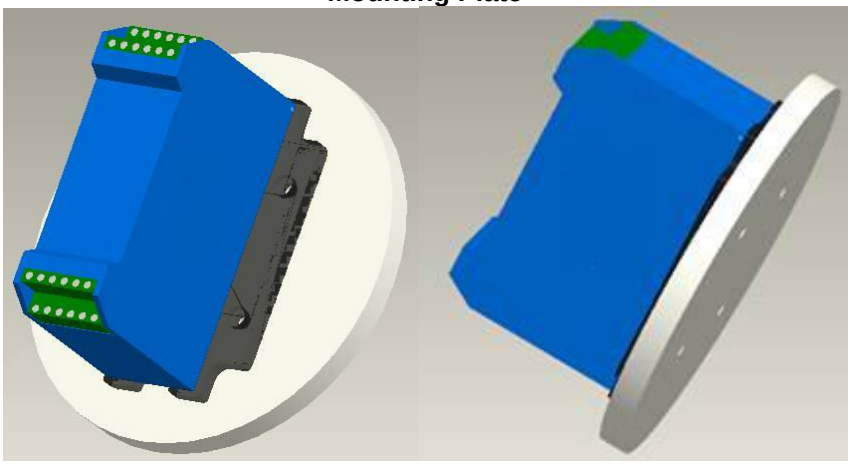
PCM370 condition monitoring software is ideal for plant wide condition monitoring. and trending of overall vibration levels

PT2060/98-PC

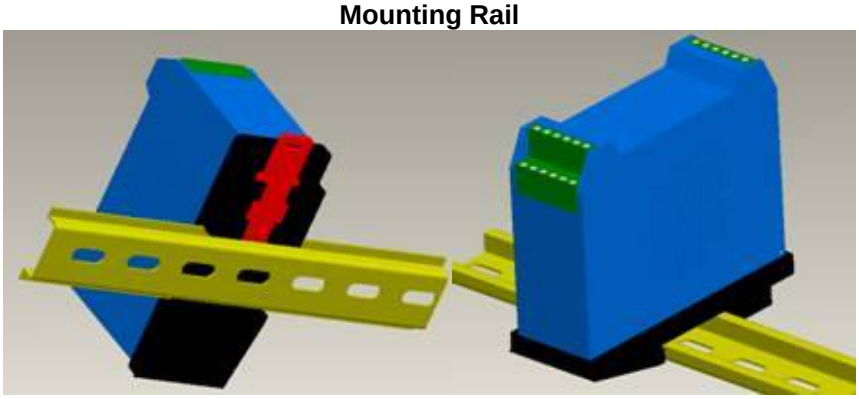
Touch panel PC with IP65 rating. Ideal to work with PCM370 and DTM-CFG

Mounting Plate and mounting Rail:

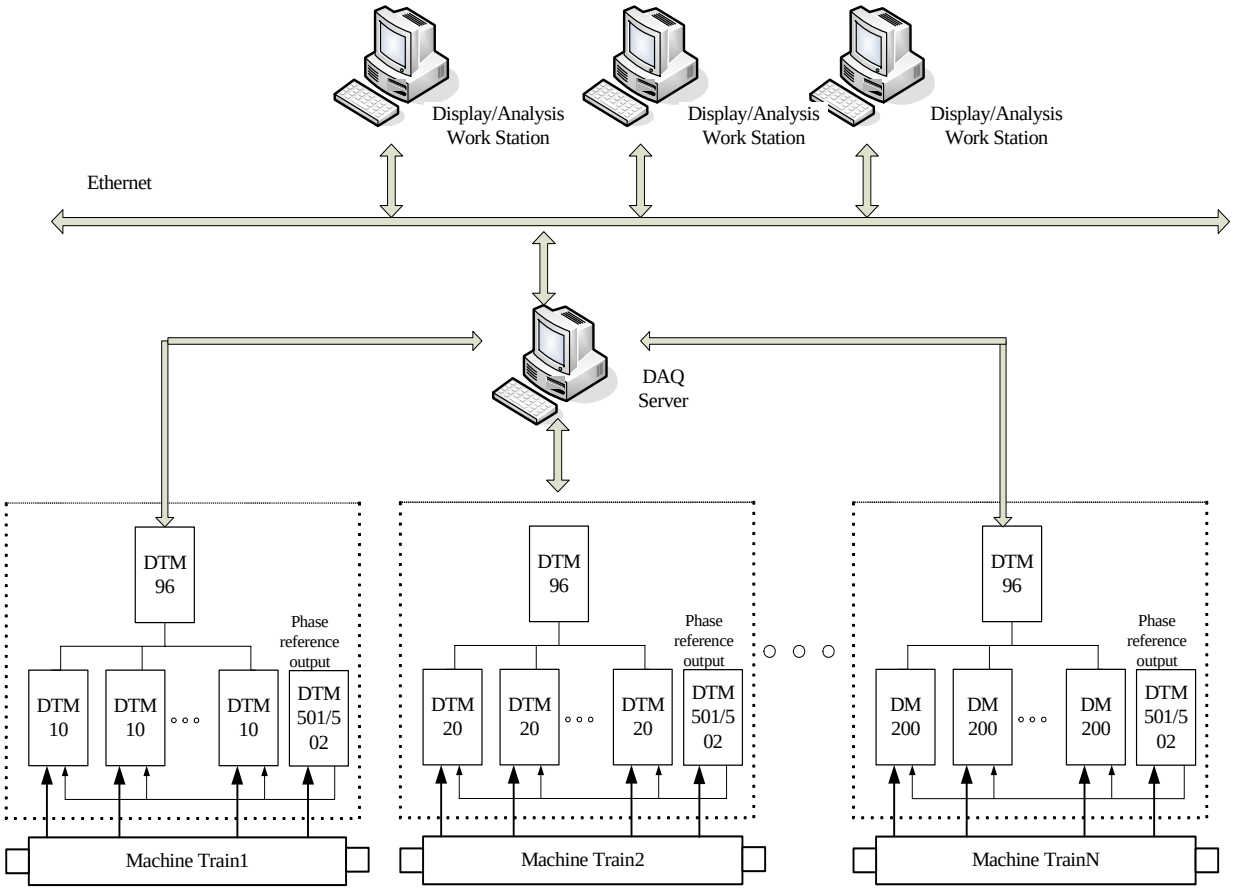
Mounting Plate

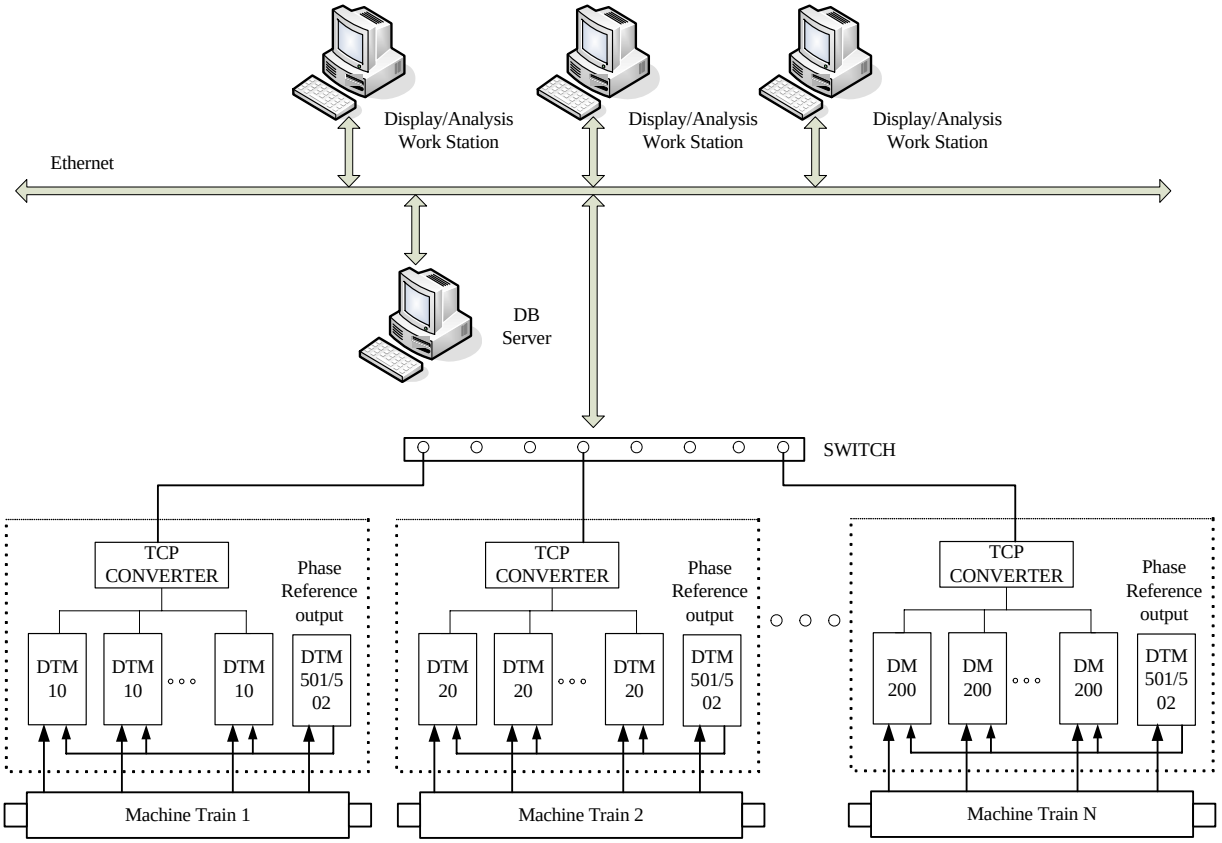


Mounting Rail



DTM networking and on-line condition monitoring




Display/Analysis
Work Station
Display/Analysis
Work Station
Display/Analysis
Work Station
Ethernet
DB
Server
SWITCH
TCP
CONVERTER
Phase
Reference
output
DTM
10
DTM
10
DTM
10
DTM
501/5
02
TCP
CONVERTER
Phase
Reference
output
DTM
20
DTM
20
DTM
20
DTM
501/5
02
TCP
CONVERTER
Phase
Reference
output
DM
200
DM
200
DM
200
DTM
501/5
02
Machine Train 1
Machine Train 2
Machine Train N

APPENDIX: DTM10 AND DTM20 DEFAULT SETTING

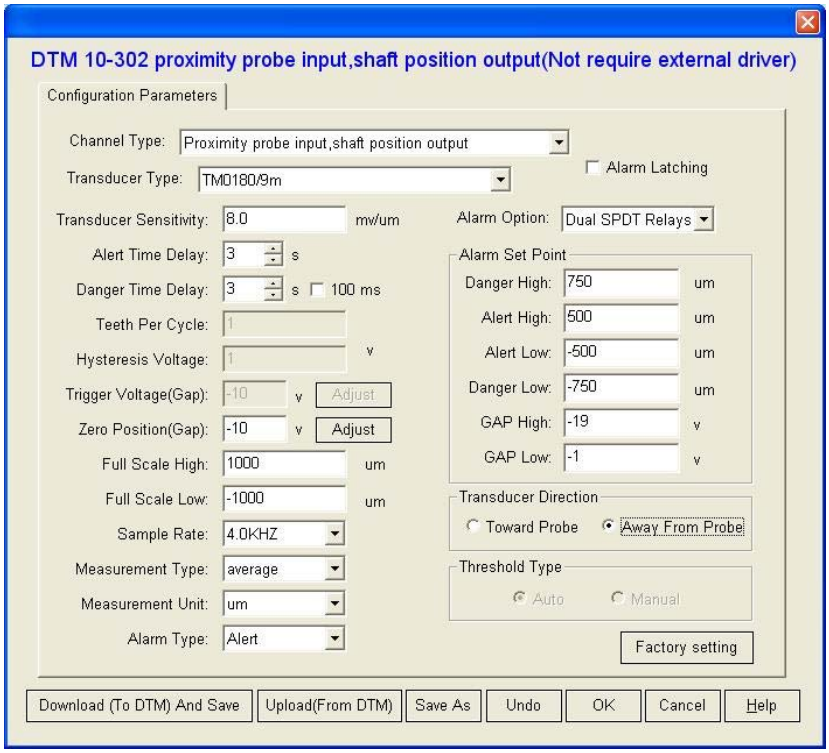


Figure 1. DTM10-C0/DTM10-302 Default Setting

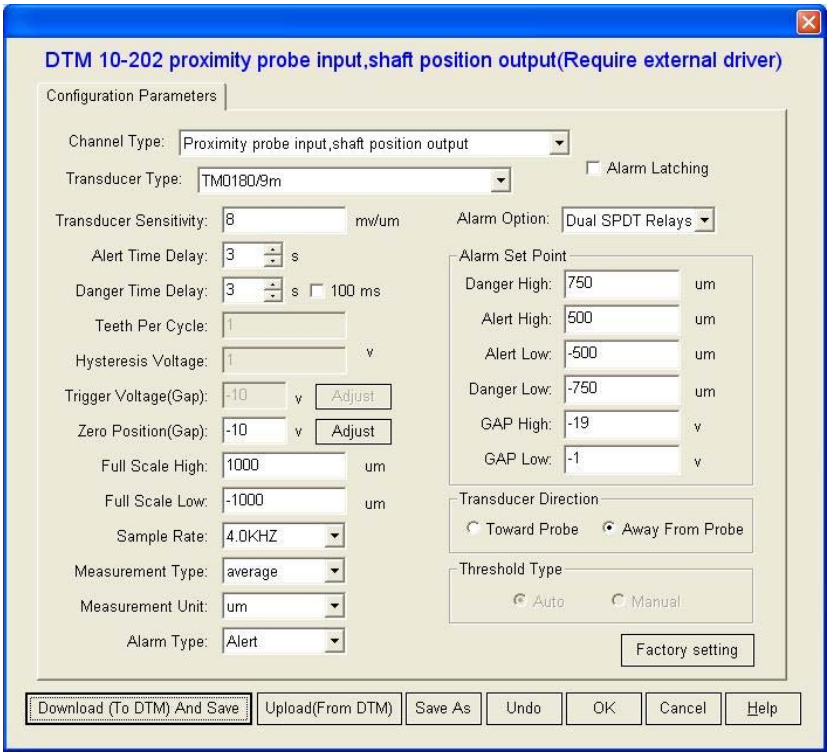


Figure 2. DTM10-C1/DTM10-202 Default Setting

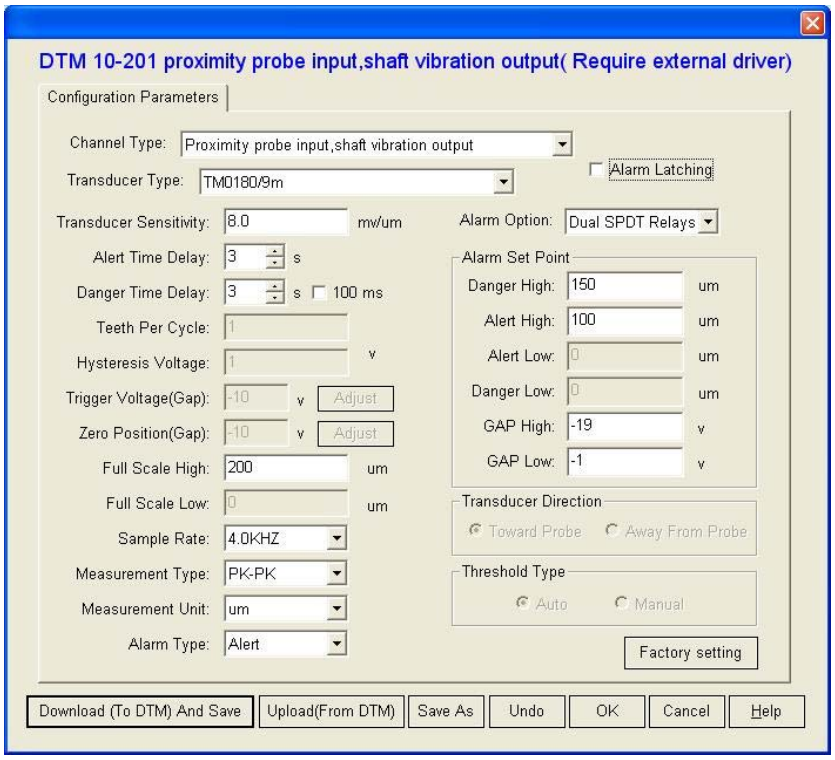


Figure 3. DTM10-201 Default Setting

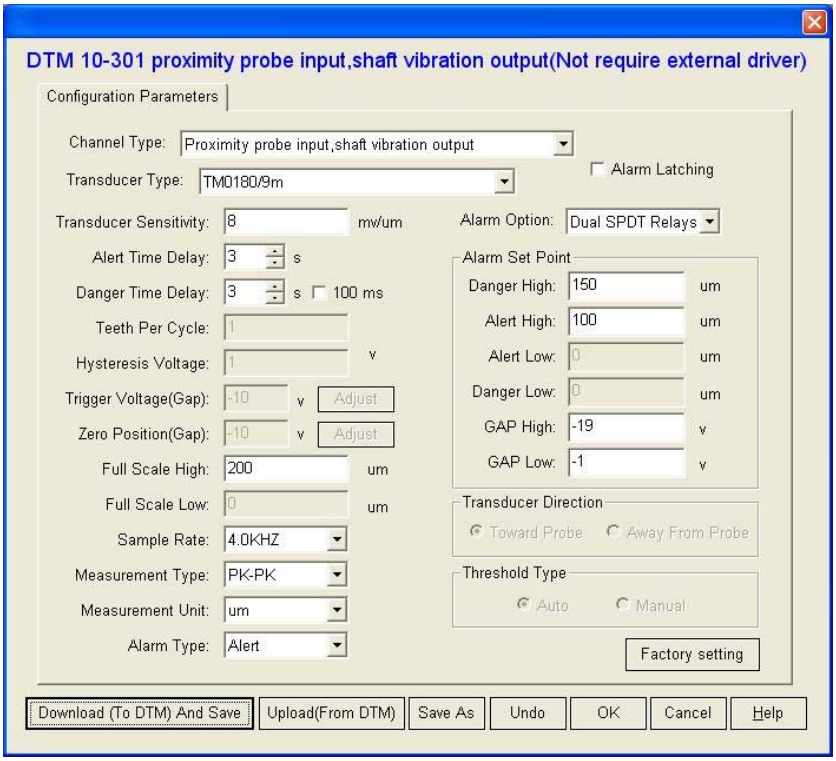


Figure 4. DTM10-301 Default Setting

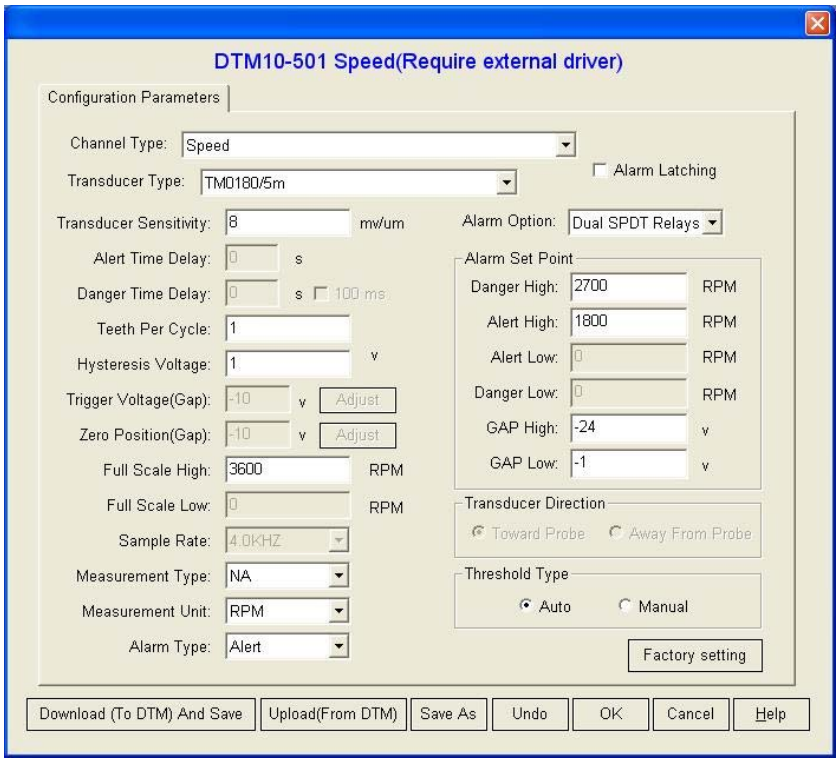


Figure 5. DTM10-501 Default Setting

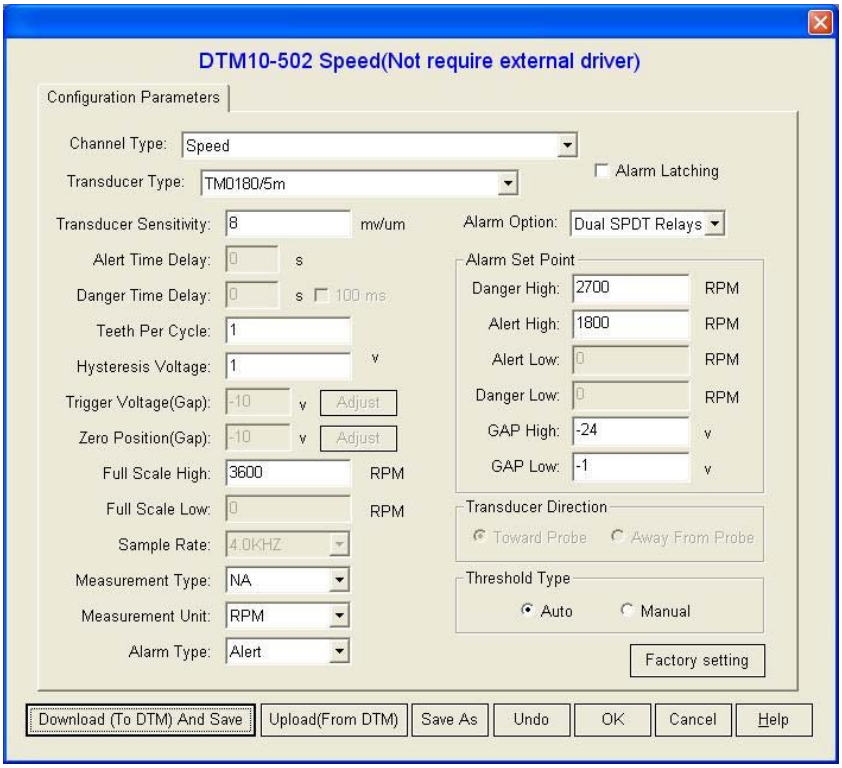


Figure 6. DTM10-502 Default Setting

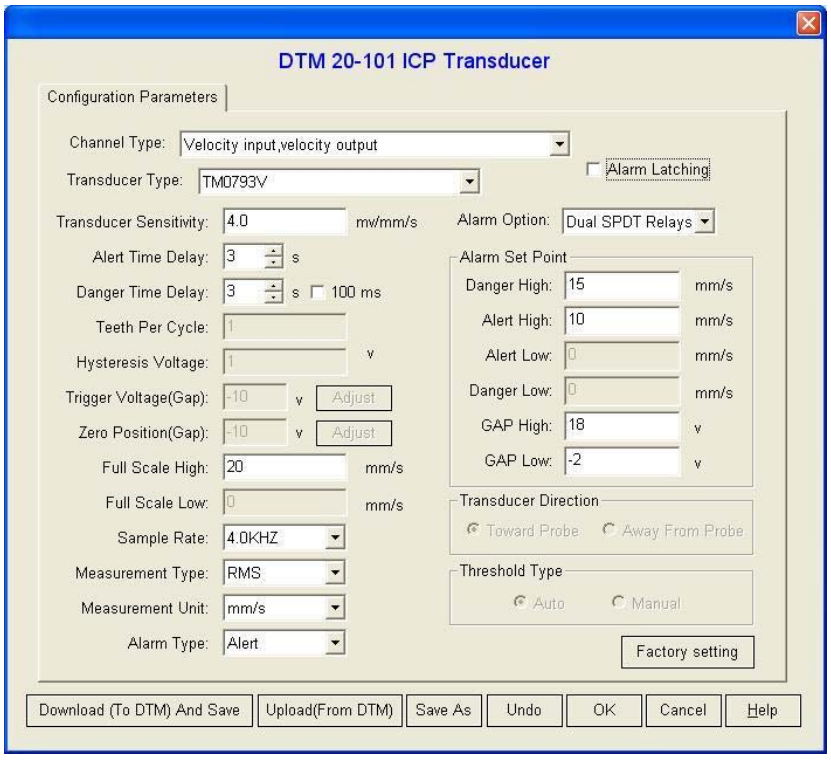


Figure 7. DTM20/DTM20-101 ICP Transducer Default Setting

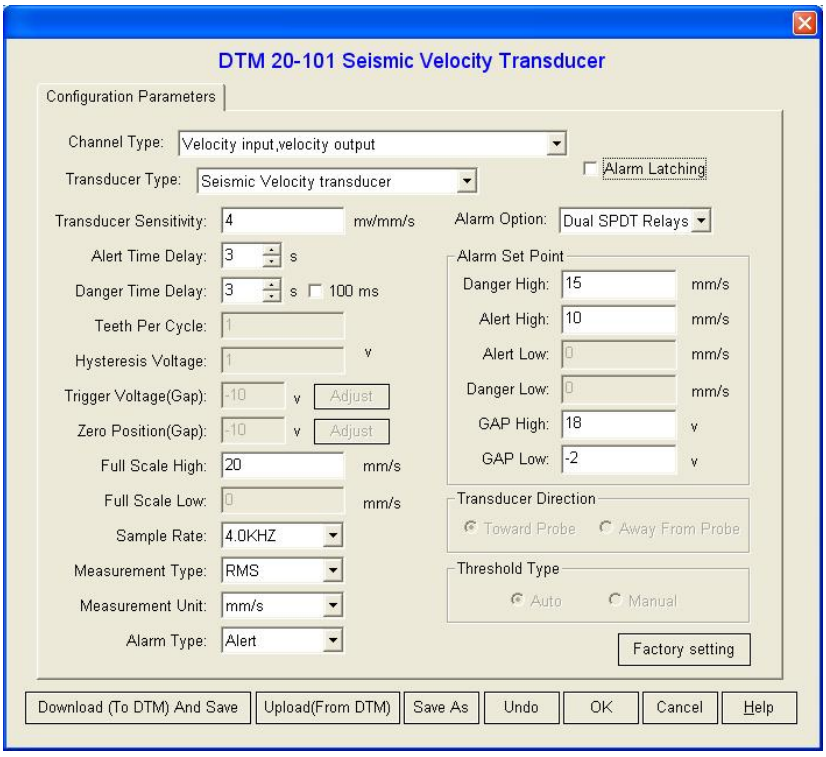


Figure 8. DTM20-101 Seismic Velocity Transducer Default Setting

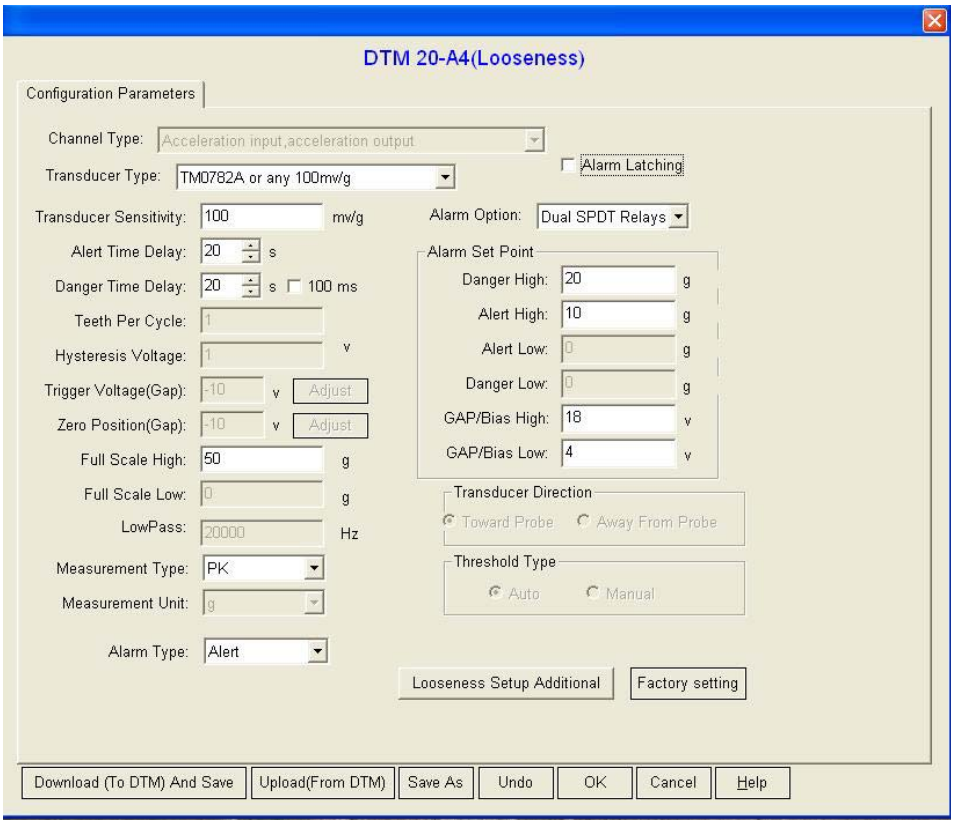


Figure 9. DTM20-A4 Looseness Monitor Default Setting